

It can't be done, Mate!

The management of a classic
car restoration business

A
detailed
look into the
operations of a
unique classic
car restoration
company.

Designed for new
and established
managers
and classic car
enthusiasts.

DREW RAFFERTY

It can't be done, Mate!

Drew Rafferty

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Why we chose the title *“It can't be done, Mate!”*

It can't be done Mate! — was the attitude we had to overcome when we decided to take on a classic car business that had a *jobbing mentality* and convert it into a systemised production facility.

To be fair, our views were somewhat strange. Normally you worked until you needed a part, then you stopped until you found one, or it arrived from a supplier. Life was easy, not much thought was required and there was little chance of having a heart attack from the pressure of the job. Then the Rafferty's arrived and they wanted the business to think out the solutions to problems long before they even became problems.

“It can't be done, Mate!”

“It just can't be done!”

Within a few months *“It can't be done, Mate!”* was not being expressed as forcefully as it had been. The new systems were introduced and every small screw and washer was accounted for, scheduled, and brought into stock in adequate time before it was needed for a car. It was a really big task, which Jean organised and controlled, with major input from the storeman. He saw the light before anyone and was instrumental in much of the success of the project.

Within six months things were beginning to work to the system and, would you believe it, they made life much easier for everyone. There was always enough material available to do the job and a lot of the frustrations disappeared. No one worked any harder, yet we produced more output at higher quality levels, with less hassle. *"It can't be done, Mate!"* was made redundant.

Introduction

We had many enquiries from people who wanted to look around the factory. Generally, these were refused unless they had some commercial advantage. An inadvertent scuff against a newly painted car meant little to the visitor, but it could mean a new top coat by the painters. That is expensive! So we restricted visits to those who understood the need to take great care, and even then they occurred occasionally. To be honest, some classic car enthusiasts are more interested in telling you how much they think they know about the process, instead of acting like a sieve and taking it all in. They talk non stop about things with no relevance and learn very little from your efforts. We've all known them!

On the other hand there is nothing as enjoyable as taking someone around the factory who is genuinely interested in what is going on. They soak it up, ask probing questions, offer useful ideas, and you really get a return for the investment of your time. Those people were seldom refused a factory tour.

In the mid 1990's the bubble burst in the classic car industry and expensive cars were hard to sell. There were other things for the rich to spend their money on. It was apparent that we could not continue to be viable with prices dropping rapidly and demand decreasing. With the knowledge that a very unique classic car business would not continue we decided to document as much of the operations as we could with a view to producing a book and video which would be our legacy to the classic car community.

The book was written ten years ago, but we could not justify the costs of producing and distributing it. The costs of getting it into book shops meant we could not make money on the project. We were aware that at some point in the future there would be an electronic e-book system which would allow us to include much more data for the classic car enthusiasts and make the cost more economical for the consumer.

That is where we are now.

Visiting the Factory

I've tried to create a situation where you can approximate to a one day factory visit. It's not easy!

On arrival you are given an overview of what we do and this might not be what you were expecting. It is necessary to understand a little of the business organisation. If you don't understand the business thinking then you are going to spend a lot of time asking silly questions. We DID operate in a manner that was considered unusual for a car restoration factory.

So, the first thing you should do is to glance at the paperwork, and get a feeling for what is there. You don't have to read the stuff – just know it exists. When Jean and I moved into the business there was very little in the way of systems. With the previous owner things *'just happened'* and delays were inevitable. Jean set up a computerised system to get full control over the organisation. If you don't have an appreciation of this, and think *'jobbing'* instead of *'manufacturing'*, then you are going to be scratching your head at every turn.

Once again, you don't have to understand the paperwork, but you need to understand the concept of what we were doing. Take a look at the decision trees so that you know how the specifications were derived for each car.

The system required a car which was being restored to be specified in a manner that allowed standard processes to be undertaken. As you go through the subsequent paperwork this will become clear.

We believed that the majority of the things we had to do in restoring a car were the same on all cars. The variations were really not all that much compared to the things that were the same. So we organised the processes on that basis.

After that brief introduction to the process you reach the section '*A Tour of the Factory*'. Then, as we usually did, we would have taken you for lunch and talked informally about the business. This would have given extra insight into the business and helps you understand how we were thinking. It is, in fact, a recreation of a real lunch with a real customer. I don't expect everyone to agree with what is said, but that's how life is. You listen, evaluate and form your own opinions about people. '*Conventional*' is not a word in our vocabulary.

Then it's back to the office to look at the bills of materials and other paperwork. From this you can work out a specification for a real or hypothetical car. In the real situation you would have been able to automatically order all the parts you need to do the job. There are also samples of check lists etc. If you are interested, you can examine the mechanic's sketches for the modifications we did.

Finally, you get the opportunity to walk around again, seeing the workers in action, and observing the whole process. This is by means of the separate 30 minute video (included with the full book purchase). The major difference between this and the real thing is that in the real world all the interesting things don't take place on the same day, far less in the same 30 minutes.

* * *

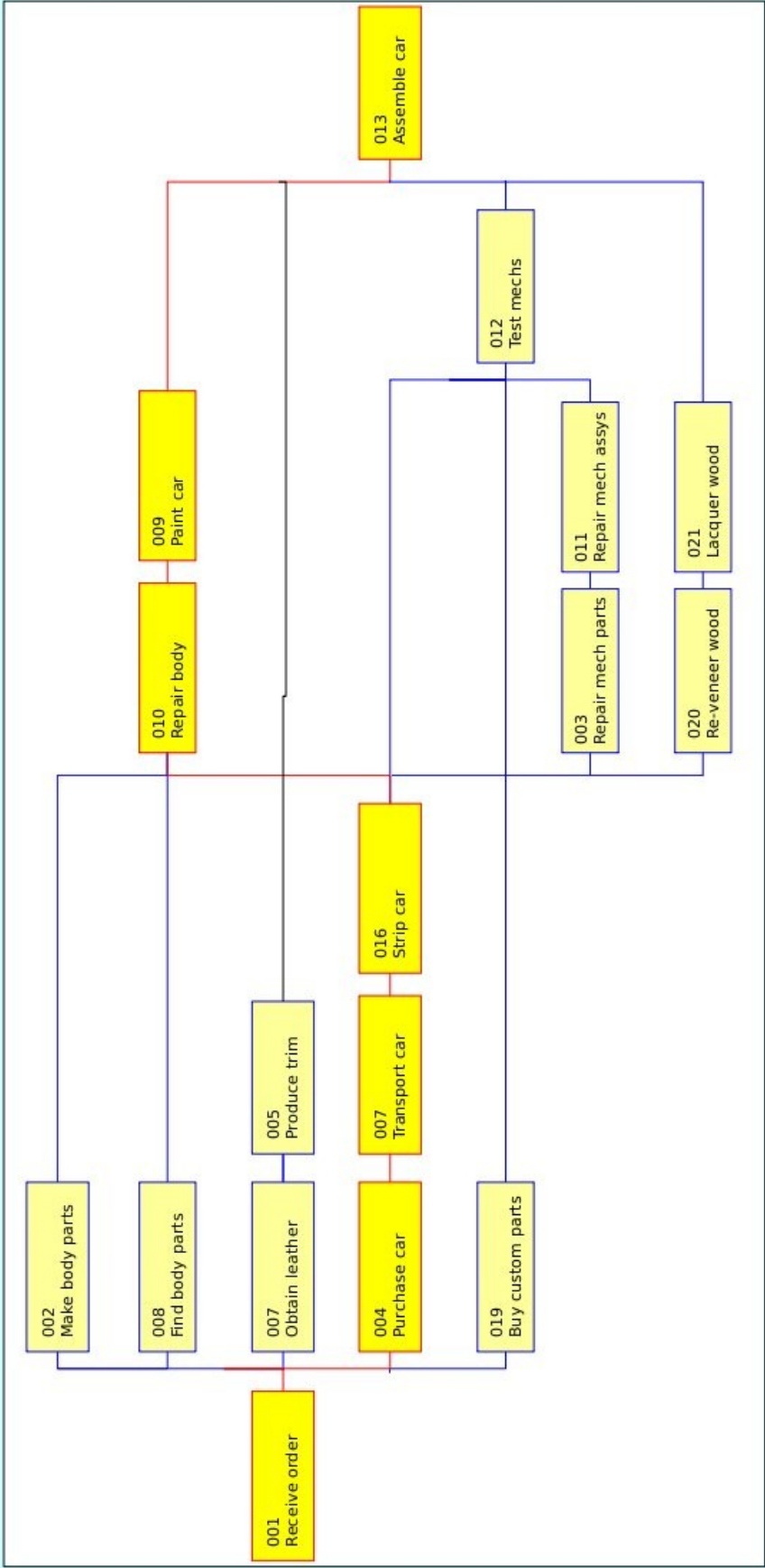
After this, you question why anyone would go to such lengths to restore classic cars. When you leave the factory you find out that in five years we shipped a hundred cars to Japan and Europe and every car was delivered exactly on time. That's what the customer wanted and that's what we geared up to achieve.

Now, finally, you understand what the business was all about!



Short Network of Production

A simple network of a car restoration



This is a very brief view of the operations. It shows the main control points for planning purposes. Within each activity there are numerous, complex sub activities, which may have totally different relationships to those of the events shown above. A glance at the bills of material will give further understanding of this aspect.

Control Systems

Before looking at the operations here are just a few details about the control systems. You need to know why staff do certain things. Our main computer contained all of our accounting systems with full stock control and ordering facilities. We had another system that our parts manager used for those parts that had to be re-used. It was set up in exactly the same way as the main system but had no monetary value attached to the items in stock. The cost of refurbishing used parts was added to each car as part of the overall cost.

Production Processes

Our computer systems had details of all the parts and the quantities we held in stock. They also held the “Bills of Material”, which were lists of the components, split up into easily manageable and logical lots. Each sub-assembly had a Bill of Material. When the car had been suitably described, such as type of engine, gearbox etc., the “bills” would be run. We then had quite a number of sheets of paper from which the storeman could issue parts to the factory floor.

You need to take a look at the “bills” for one car to see how much this number was. The whole system (5,000 discrete parts) was set up and run by Jean, totally in-house. After some hesitancy, the staff came on board and helped make it work. Naturally, some parts were not available at the right time and a system was developed to enable these to be kept under control.

Project management

When a car was ordered by the customer we had to decide how it was to be manufactured. The first stage was to consult the decision tree and find out which sub-assemblies were required.

Basically the options were:

- Left or right hand drive
- Manual or automatic gearbox
- 3.4 or 3.8 litre engine.

That was the easy part. The car was built by Jaguar over a number of years, with many improvements as production progressed. We had to be aware of these and make the necessary arrangements to buy the correct car for restoration and the correct new parts. For this reason the decision tree process was undertaken manually, since it involved very little extra time over pressing a button on the computer, and we could be more responsive to the actual situation.

Bills of Material

- Using **Decision Tree**, decide which final product is required.
- Assign a project name or number.
- Use **Bill of Material Pick List** to request Bills of Material (Product Assembly) journals from accounting system.
- System generates Assembly transaction and flags any items not available in stock.
- Transfer any missing items to **Bill of Material Deficit** form.
- Create **Purchase Order** for all missing items.
- Goods received from supplier - check off against Purchase Order and issue to project via **Bill of Material Deficit** form.

- Enter all receipted items into accounting system and book out to project. System automatically updates inventory records, supplier records and general ledger.
- Using **Job Card** track all issues to project.

Costing

- Create **Job Card** for each project using assigned project name or number.
- Each member of staff must complete daily **Timesheet** and book time to individual projects.
- Enter **Timesheet** data into payroll system and extract cost detail. Add to **Job Card**.
- On completion of project, use journal entries to ensure all costs are captured in the General Ledger of accounting system.

Inventory management

Inventory levels had previously been set up with optimum stock holding of each item.

- Using accounting system, run Alert Report (or Reorder Report) to establish stock ordering requirements.
- Create **Purchase Order** for all items required.
- When goods received, complete **Goods Inwards** form.
- In conjunction with supplier's delivery note and/or invoice, enter into accounting system. System automatically updates inventory records, supplier records and general ledger.
- Stock items required during manufacturing process

for anything other than a Bill of Material must be requisitioned via a ***Requisition*** form.

- Issue items using ***Stores Issue*** form.
- Enter into accounting system, which will automatically update inventory records and general ledger.

Quality Control

The motivational techniques used in the business gave everyone a degree of authority over the production operations. Any person had the right to reject work presented to them and return it to the previous production stage. We operated on the basis that, unless they had materials which were at a 100% quality level, then it was physically impossible for the product to leave their department at 100% quality level. So, everyone had the authority at any place on the factory floor to step in and take action if they suspected quality had not been optimised.

During the manufacturing process a number of check-lists were available to ensure correct manufacture, such as :

- ***Panel shop checklist***
- ***Mechanical checklist***

On completion of each car a final Quality check-list/inspection form was completed, with full car details including chassis number, engine number, and serial numbers of any fitted options, such as stereo unit, etc.

You can read more about quality aspects in The Owner's anecdotes over lunch.

Customer Order Received

The customer orders from the specification. Using **Decision Trees** decide which Bills of Material will be required: *(Full copies of documentation appear later on).*

Bill of Materials Issue
form is used here

- A marked up Bill of Material Picklist is used as the basis for running Bills of Material or Product Assembly journals in the accounting system.
- The accounting system will flag any items that are not available in store. These items will need to be ordered separately.

Bill of Materials Deficit
form is used here

- Using Bill of Material Deficit Form write up all items flagged. Use this form as basis for Purchase Order and issue of parts to project when received.
- Order these items using Purchase Order, or accounting system can be used to generate Purchase Order and keep track of outstanding items.

Stock Inwards
form is used here

- The Stock Inwards form must be used to record the receipt of all goods, and forms part of the audit trail for financial year end purposes.
- Information will be transferred to the accounting system to update inventory levels and accounts payable.



Continued overleaf

Stores Issues
form is used here

- This form must be used to record all inventory items issued without a Bill of Material

***Schedule of Repairs/
Manufacture***
form is used here

- Form used by production staff to request repair or manufacture of special items

Final Inspection
form is used here

- Part of the Final Inspection form, used in the final quality control process to ensure all aspects of the product comply with the customer's requirements and meet the company's specification.

***Timesheet/Job Card
Allocation***
form is used here

- Timesheet used by all staff to allocate time and costs to individual projects.

Customer Questions

Here are a few questions some of our other customers have asked.

Is the business really efficient in terms of the space it utilises for the production?

We had no input into the design of the factory, which was an ergonomic disaster, par excellence. The idea had been to have a flow system, but no thought was given to the practicalities.

As you will have seen, the assembly area was so narrow that all cars had to be taken outside when the one at the back had to be moved! The centre section was the stores area, which worked quite well. Also included were individual workshops, the need for which was highly questionable and which would have been better utilised as a wider assembly area.

The panel shop was fairly large, but this gave an added safety bonus. The amount of sparks flying around was always a concern. Having more than the minimum space was a great help.

What appears to be the attitude of the staff?

We had a very informal arrangement of working. There was work to be done and we couldn't waste time but, with the major priority being to achieve exceptionally high quality levels, pushing people did not help. The advantage of having such an objective which, quite literally, was to be the best in the world, made it easy to motivate people. So, in general, they could be left to get on with things, because they wanted to get on with things.

We did not have very many secrets in the business and staff generally knew what was going on at all levels. That doesn't mean we didn't have heated discussions at times and pressure to get a job finished, but we all felt no one was deliberately being obstructive. So each of us could let off steam and within a few minutes be back to normal, without anyone feeling bad.

Above all, the staff had the respect of management. Not some IR nonsense, but a genuine respect for their abilities. This was conveyed through allowing them unlimited scope to complete the work as they wished, without any interference, and making sure the customer's comments were quickly and fully passed back to them.

In addition, they appeared in magazines, newspapers and on television. There are few more motivating experiences than being seen demonstrating your own world beating quality on national television.

How did the product actually rate?

Initially, it was impossible to tell. The car business is hardly the most ethical. In my experience it is populated with a great many people who are intent upon seeking out an honest person and taking him, or her, for as much as they can. The nice manners are just a veneer. I have spoken with other people in similar fields and they all say the same thing.

The common practice is to take delivery of the product and then make complaint after complaint in the hope that you will get a reduction in the price because of all the problems. Some people are not above removing good parts and substituting bad parts, then complaining about the quality.

One of our customers tried to copy the car exactly and sell it himself under our name. Unfortunately, he was only interested in

making money, not a quality product, and had to return to the fold for his supplies when his product failed miserably. And those are just the stories I can publish!

We hit our maximum quality levels about halfway through the project and at that time there was no other business able to provide a product to our overall quality levels. Nor could they have matched us on price. One or two people, making a car a year, were able to come close to the quality levels, but there was no commercial success in that.

What was the management style?

As you will have gathered, the style of management was based upon mutual respect and a product with high integrity. Motivating people is easy. You simply create conditions where they are happier at work than being elsewhere. The problem is then getting them to go home. Several of our staff had wives and partners who must have been difficult to live with, and some of the staff probably were difficult to put up with as well. Arguments and rows were common in the domestic field.

At work everything was different. A person had respect. They were treated in a manner which reinforced this. They could hold their heads up, not just in doing their work but in developing one of the leading products of its kind in the world. People in the local community knew where they worked and what they did, and how well they were achieving things. They had genuine pride because they were recognised as doing a good job. And the boss never told them what to do!

In order to assist the employees, I managed the operation and designed the operational systems. These had a purpose and, although it may have taken some time to overcome initial prejudice, within months the benefits were obvious and they knew

it had been undertaken for a very good reason. So the quality improved as each car left the factory.

I am not suggesting that I was flavour of the month with everyone. Even if your manager demonstrates total respect for your abilities, and you reciprocate, your circumstances may force you to castigate him in the pub. A person has to react to the local circumstances in order to be accepted as part of their particular community. It was only acting as part of the herd. When the individual was back at work the exterior roughness was stripped back, the common objective placed in focus, and the mutual respect returned. I didn't bother about what transpired, just as long as the quality of the product kept increasing and the customers were fully satisfied.

For a business of this size (28 employees), are the systems an overkill?

The answer is both yes and no. "Yes" in the sense that the production was small in relation to the effort involved, but "no" in regard to the degree of control we had over the operation. Remember, almost none of the employees had any experience of anything other than jobbing. In jobbing, delivery promises are always hopelessly optimistic and quality problems are tackled remedially. Parts are ordered when needed, not planned beforehand. So we had a major cultural problem to overcome. Without fairly foolproof systems to control the operation we would never even have begun to achieve the objectives.

The systems were set up wholly internally with no external input whatsoever. The software costs were negligible and everything was run on a first generation IBM compatible computer. The only shop floor cost was setting up the bills of material, which was done in conjunction with other jobs and helped in speeding up the learning curve on parts knowledge.

It also created credibility, especially with tax inspectors, auditors and bankers. They could clearly see the professionalism of what we were doing, with daily reports being generated on what was really happening.

A tour of the factory

When you visit a factory for the first time some kind person is usually allocated to provide you with a factory tour. Sometimes the person will be knowledgeable and able to answer the most technical questions with competence and, at other times, the person *'drew the short straw'* and was landed with a job they didn't want. Knowledge is not directly related to position in the hierarchy.

This part of the book is similar to a slide show and with the separate video has been designed to create something close to walking around the factory, asking questions of people and receiving abbreviated answers. Sometimes you want to know more and sometimes you are told things that *'bore you out of your skull'* but that is how it goes in real life.

At the end of the factory tour you should have a reasonably good indication of what went on and, certainly, this is probably better than spending the equivalent period directly on the shop floor.



The following may assist in identifying the assembly operations:

- Mask up car
- Underseal underside of body
- Tap out threads in body shell
- Fit blanking grommets
- Fit main fuel line
- Install fuel return line
- Install rear brake lines
- Fit brake servo (booster)
- Fit pedal box and slave cylinders
- Fit fuel tank
- Install petrol pump and fuel hoses
- Install air-conditioning unit
- Fit air-conditioning hoses
- Fit handbrake and linkage
- Fit exhaust mounts
- Fit radius arms for rear suspension
- Fit leaf springs
- Fit rear suspension unit
- Fit front suspension unit
- Fit door panels and adjust
- Set up door frames
- Fit boot (trunk) lid
- Fit Bonnet

These items do not include trimming and mechanical work, or obvious items such as fitting wheels, which can be ascertained from the video and slide show.

These were the maximum numbers of personnel employed in the operations:

- 2 Stripping
- 8 Panel Shop
- 2 Electroplating
- 3 Trimming
- 4 Mechanical
- 3 Painting
- 4 Assembly
- 2 Stores
- 2 Admin and Management

Delivery times in days (received on site)

- 50 Import car from USA or Europe
- 10 Import parts by airfreight from Europe
- 42 Import parts by surface from Europe
- 4 Purchase local parts (economy delivery)
- 1 Purchase local parts (air delivery)

Shipping times (to foreign port)

- 50 Container shipment to Europe
- 12 Container shipment to Japan
- 3 Air freight to Europe
- 1 Air freight to Japan

Personnel were very flexible and would undertake any kind of work if they were needed. We had no demarcation within the business. Mechanical staff did much of the assembly of the car.

A Mark 2 Jaguar can just be fitted into the cargo bay of a Boeing 747. Trans-shipments to Europe and Japan via Singapore were a nightmare, with damage often occurring. Air freight was five times the cost of sending by sea, and around the same as the amount of profit we made. This may help you appreciate the need to manage the business as we did.

New parts were often in short supply. In addition, since we were 12,000 kilometres away from the main suppliers, and had tight production schedules, we sometimes received parts of dubious quality. The hope was that we would have no alternative but to use them. Such parts would never have been accepted in the UK. We bought from several suppliers and sold off the inferior parts locally. On one occasion, we sent an employee from the South Pacific to California. He bought a steering rack from a Jaguar agent and flew back again on the next aircraft. We took our delivery promises very seriously.

Improving Quality

Motivation

One of the most important factors about the business was the campaign to improve quality through motivating the staff to develop the product without interference. In the technical fields, they told me what to do, not the other way around. That was what they were paid to do. So the modifications were the result of freedom to do what they felt was right and not because the 'boss' told them so.

Remember this philosophy as you try to unravel the development of the modifications. I don't tell you any more than I told them — the customer wants a car that looks good, drives well, and doesn't break down.

So you have the photos, the parts lists, the shop floor sketches, the bills of material, and an objective. But beware! Many items were continually improved. There may be '*red herrings*', with photographs and sketches not matching because they refer to different modifications.

The final cars had reflective foil on the firewall. Work back from there. I hope my efforts stimulate discussion on the restoration of classic cars and that some thoughts make the job just a little bit easier for those involved in the business.

Quality Problems

Shortly after I joined the organisation, the Japanese took the opportunity when visiting the factory to outline the problems they were having with the cars.

They had asked their staff to prepare details of the problem areas. I had not been involved with the quality of the product.

They were very unhappy with our cars!



The wavy sides were a problem which had to be tackled

The same car from the other side





Geometry could be suspect,
as was radiator grill spacing

Geometry from a
better angle?



Cars in Japan

The cars were causing severe problems in Japan as you have seen. Japanese business people expect the highest standards and the car just did not have what it takes. The result was that sales people were ashamed of their product. Things became so bad one car was returned to be restored a second time.

A particularly bad example was a yellow car, and photos of this follow. There are no photographs of the construction of the car, but you can let your mind form its own conclusions from the construction of others at the same time.

One Japanese television personality drove his new car to the opera where it promptly broke down in front of his fans. He was severely embarrassed. Perhaps that is not the best way of developing brand loyalty!



Sandblasting was inadequate, especially underneath



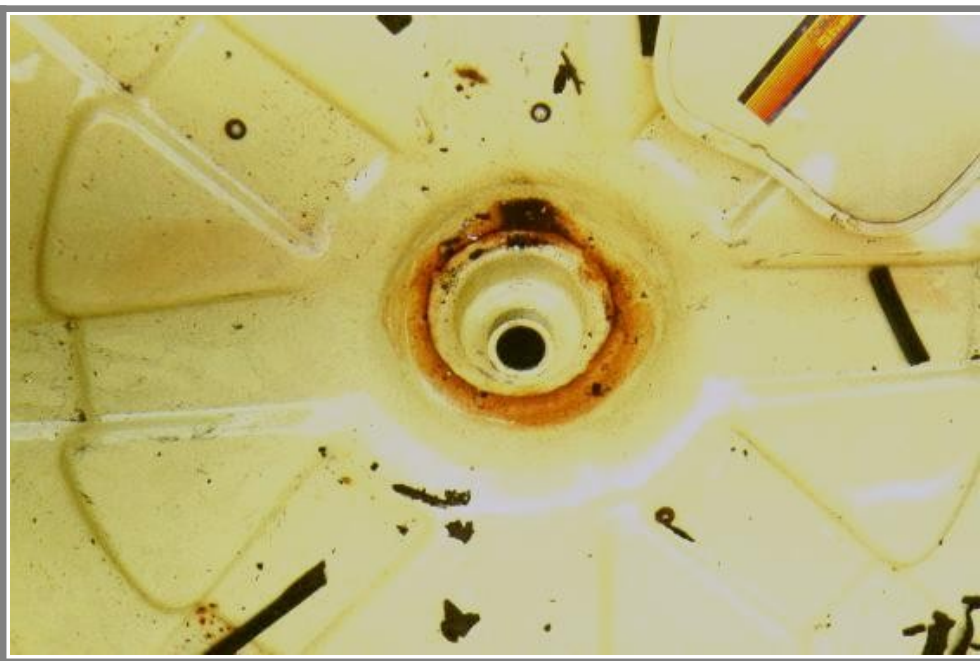
This is the restored *yellow* car which could not be sold in Japan and had to be returned for complete restoration.



A rear view of the car as it was being dismantled.



When the car was stripped, this is what we found underneath the carpets and foam insulation – rust!



The spare wheel well is notorious for rust on old cars (*and the yellow car*).

Quality Standards

As you can see the problems were very serious by any standards. But in the context of the exceptionally quality conscious Japanese market we faced a disaster.

During the next few years the car was developed to very high standards. This did not come cheaply. For example the customers in Japan were only happy with the quality of the air conditioning after car number fifty. That means fifty attempts were made, and we were not stupid people!

The world is full of people with instant solutions to business problems. They mean well, but they sometimes just don't appreciate a solution that appears to work initially may fall down badly when put under severe practical conditions.

Finding Cars

My staff would go and inspect cars and make their pronouncement on the ease of restoration. A total restoration of the body is expensive and so the better the body was to start with the cheaper the restoration would be.



Every one of the staff, myself included, at some time bought a lulu! It's just part of the game. You never know what's under the paint until you strip it off.

The Panel Shop

I'll now describe the operations of the panel shop. When things were hectic we had eight panel beaters. This dropped to four when Jean and I owned the business and realised lower output at higher quality was preferable to high output and lower quality. More money for less work! That's something that can be applied to any business.

During the slide show, the product will change as development took place. Manufacturing procedures were always being updated to improve quality. A practice seen on one slide may have been superseded many times as we began to appreciate the needs of the customer. But everything is included, warts and all!

When you have a very critical customer it is easy to draw up a corporate objective. He leaves you in no doubt as to what it should be. For the manufacturer, our real objective is just to get them to pay for the quality standards they demand.



At the height of production up to a dozen cars were awaiting restoration

Stripping

For those who do not know the restoration business, the first operation is to strip the car into the basic components. Having done this, each part can go off in its own direction and receive whatever treatment it needs. For many it is into the scrap bin, to be replaced with new components.

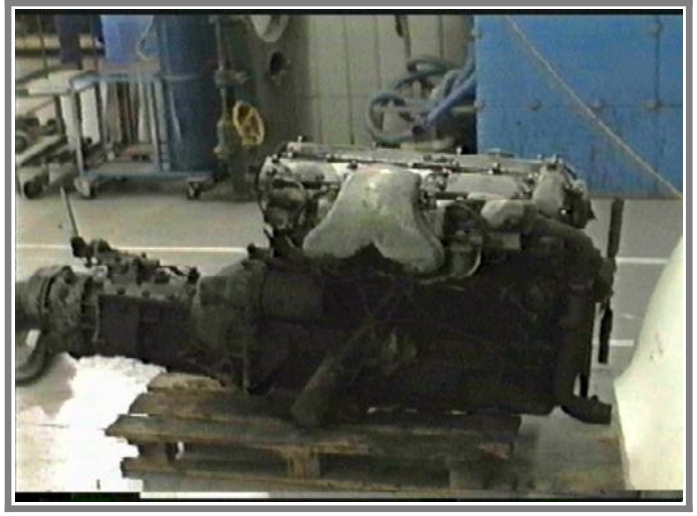
The Mark 2 was one of the first monocoque bodies, meaning it did not have a separate chassis. The strength of the whole car was in the body alone. Restoring the body had to be done correctly, otherwise there could be a serious safety problem.

Replacement body panels for the car came from small production runs and the quality could be quite poor. A poorly made panel could result in many hours of panel beaters' time in rectifying the problem. You have to approach body restoration in a very statistical manner, working out the chances of things occurring and the costs involved in the various options.

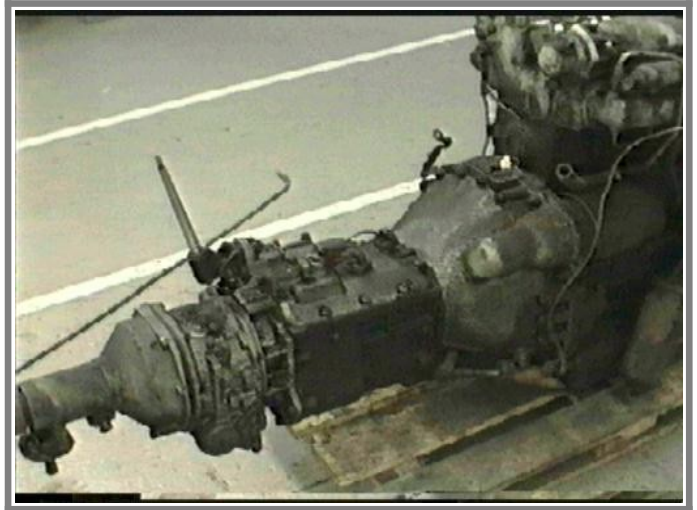


The stripping bay in the Panel Shop

The engine and gearbox were removed from the car. The gearboxes were not suitable for the customer's needs and were discarded. They were replaced with models from more recent cars, such as the XJ6.



Engines were totally rebuilt, including various modifications to eliminate some of the known problems with the Mark 2. Conversion to unleaded fuel was undertaken.



A body after stripping, but before sandblasting



The bodies were sandblasted to remove rust, paint and anything else adhering to the steel

On some cars massive amounts of lead filler were evident. Monday mornings and Friday afternoons on the production line?



It was practice to turn the car upside down and fix the chassis first, but sometimes essential remedial work was necessary before any stress could be placed upon the car.



Supporting the bodies on steel hoops makes it easy to turn the car over. But it does produce *banana shaped* cars.

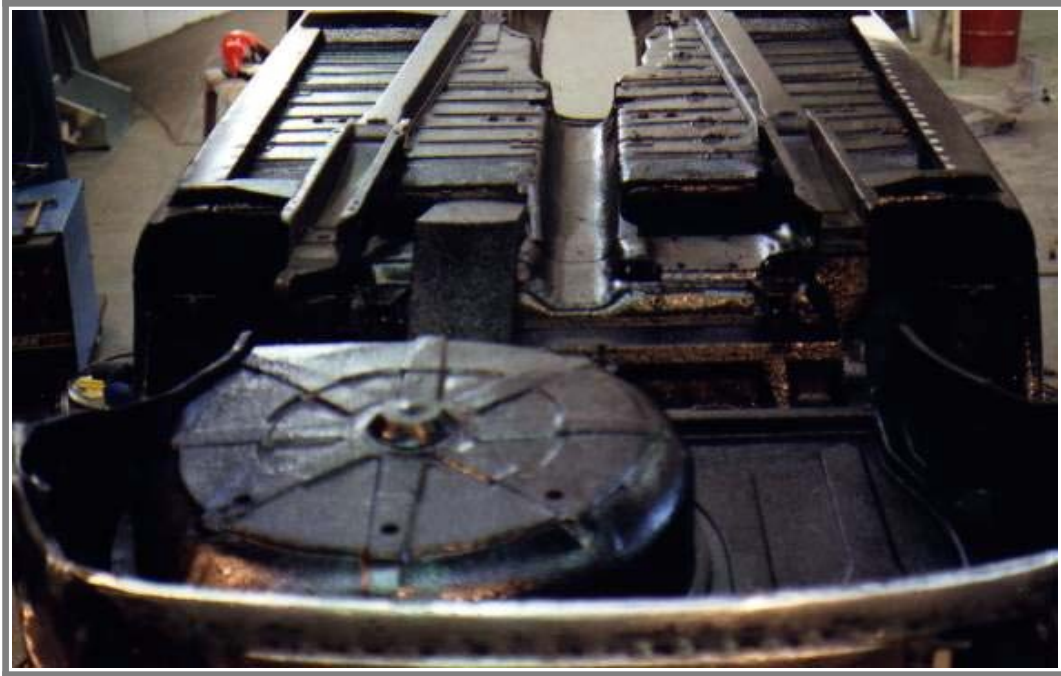
A range of templates, including suspensions, were necessary to ensure dimensional accuracy. We learned the hard way!



The sills almost always had rust hidden inside. We changed them as a routine operation on every car. Later on, the sills were cut off before the car was sent for sandblasting, to expose the areas.



Even after fitting new panels, a thin film of body filler was required to get the exact shape. We *DID* work to very high standards.



The underside of the car in the early days

Sandblasting or Acid Dipping

There are endless discussions on sandblasting and acid dipping. Acid dipping is supposed to get into every hidden part of the body and eat the rust away. But it has to be washed away, otherwise the action would continue forever. This exposes the steel again to moisture, the great enemy. If the job is done correctly it has good advantages.

On the other hand, sandblasting does not allow rust to be removed from everywhere, but neither does it introduce materials which are detrimental to the steel. Chemical rust inhibitors and bonders can be injected into the hidden areas to neutralise the rust. It would appear there are advantages and disadvantages in both systems.

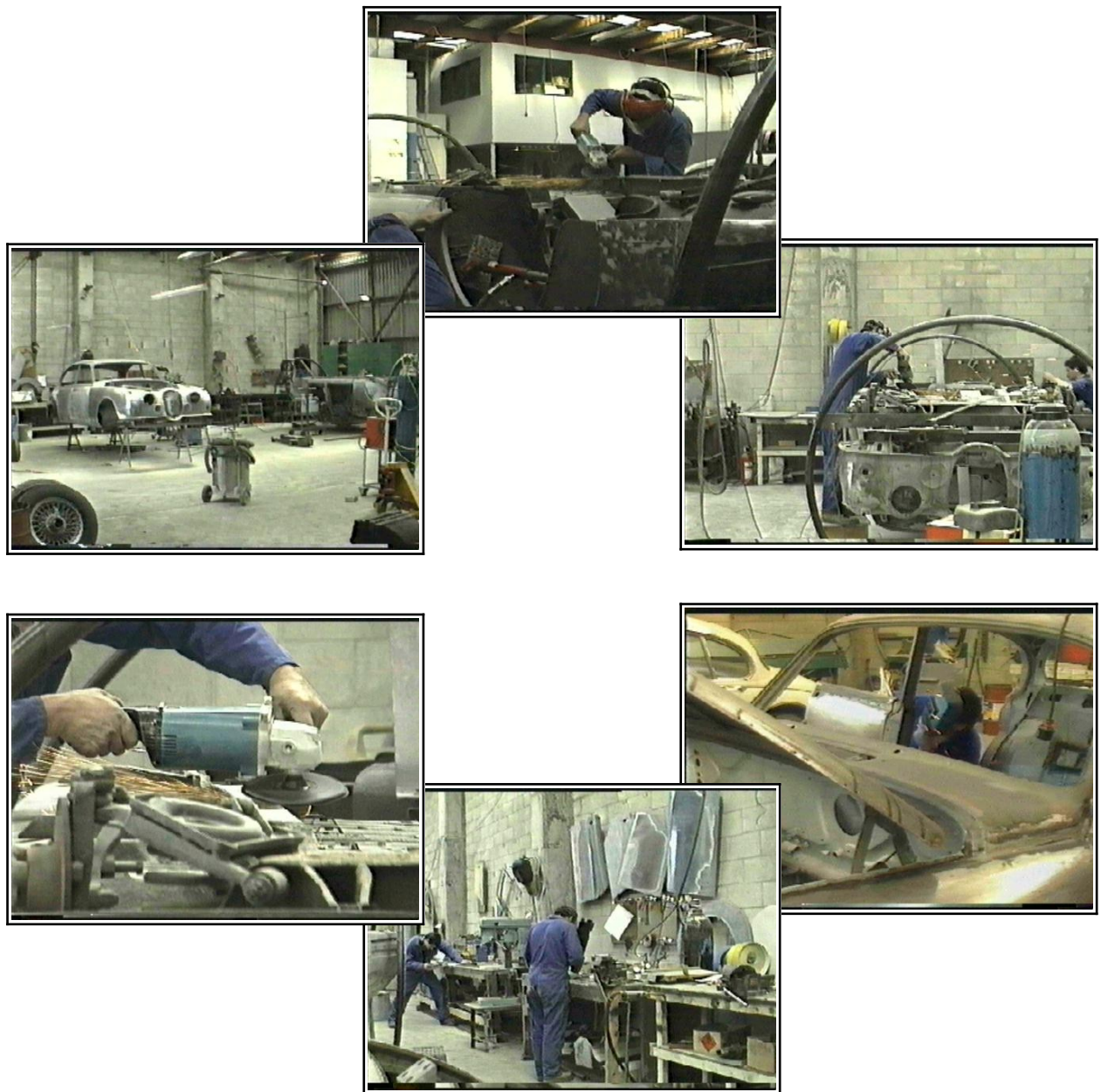
Why did we go for sandblasting? That's easy. For scientific principles? – NO! For personal bias? – NO! What then? There were just no dipping facilities in our area!



You can see the relatively light rust inside the sills



A body being worked on in the early days



Timing

Using a two man team it was expected that a car would move through the body shop in four weeks. Some cars were eight weeks, and we lost money on them. But you can't always tell.

There were many modifications to the body to accommodate air-conditioning and a host of other things, such as repositioned seats etc.

It would have been easy to drop some body filler onto the car, but we were charging a lot of money for a high quality product. I hate to think what would have happened if we had done a quick and nasty job and the new owner had an accident and all this filler fell off onto the road. Anyway, the clever customers use thickness sensors before they pay and take delivery.

Knowing what I do about the industry, I don't blame them one little bit!



After the chassis and the major geometry is correct the body is then fully restored



Panelbeating Skills

Door skins can be bought, but they were not good enough for our purposes. You will recall the wavy sides on the early cars. We made our own door panels and they could be fitted to give the exact body line required.

Minor variations in the smoothness of a body can sometimes be corrected at the paint stage, as successive coats are built up. However, there is no substitute for the human hand. Running a hand along a panel can detect minute variations the eye may be fooled into missing by tricks of light and reflection. It's a skill worth learning if you ever want to be involved in a car restoration.

If you ever thought panel beaters are just big strong rugby players with a hammer in their hand, I suggest you think again. At this level the skills are very evident, and consequently very valuable.





Lead Filling

When Jaguar produced the Mark 2, production tolerances were not the same as today's cars. If things didn't fit, lead was melted into the offending area and smoothed off. But since then we have put lead on the list of dangerous substances, with good reason. It befuddles the brain after lengthy exposure.

The fillers used in repair work are formed by a chemical reaction of two substances. These may, or may not, be harmful to health. Studies, usually funded indirectly by an organisation with a commercial interest in certain results, are often used to draw people away from some products. If you believe these reports you would not eat or drink any product again, for fear of injuring your health. In fact, you might have to stop breathing air!

So we used filler, because we knew lead was bad for health, and we had no evidence that fillers did the same.

The Painting Process

The Spray Booth

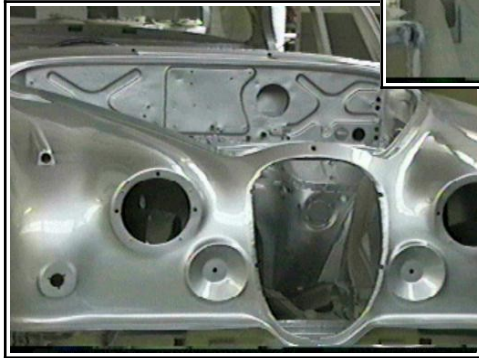
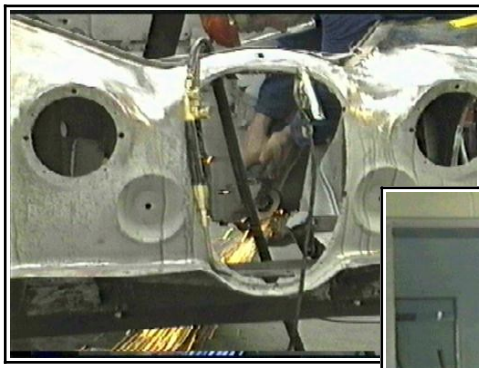
I don't have many photos of the painting process. This is due to the fact that paint being sprayed and camera lenses seem to be mutually attracted to each other. I have managed to extract a few frames from the video of the operation and I hope this gives some idea of what happened.

The video will help give you a better understanding of the process.

The cars were taken into the spray booth from the panel shop. There was a door on the other side which opened into the assembly area.

Dust extraction systems were in place to stop dirt contaminating the booth.





Preparation

When the car had passed the tests imposed by the painters, and they had complete authority to keep sending it back if they were not happy, the paint preparation process began.

Initially we used ICI paints, made in Australia. We had problems and a switch was made to Glasurit. The paint was probably no better, but the psychological aspects made the painting better. When we changed later to Spies Hecker the quality improved once again.



Don't underestimate the effect on quality by letting staff have the raw materials they want. They FEEL good and the quality improves. It's a fact!

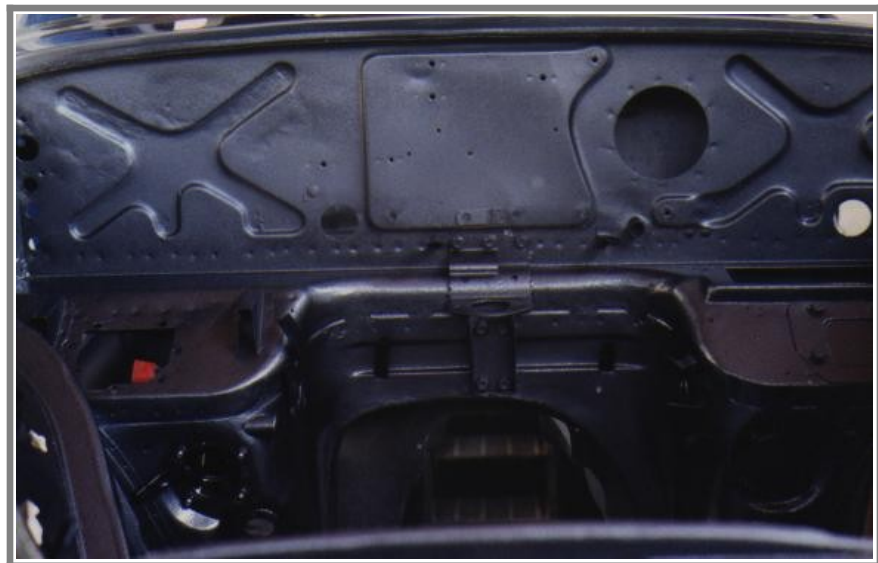
The paint process is quite complex and we allowed two painters two weeks each to do the job. The first thing is to ensure the steel is absolutely clean. Then a bonding coat is applied, to make sure everything else sticks.

A successive number of coats of a filler are applied, to make the body line absolutely smooth. Each of these is rubbed down with sandpaper to get rid of the high areas and identify the low areas.

On the next filler coats the low areas are filled again, until they are level with the rest of the body. At each stage rubbing down takes place. Finally, when the painters are happy that the body is perfectly smooth, they put the colour onto the car.



Most of our customers asked for two pack paint, in which a curing agent is added to the paint, causing a chemical reaction, just like epoxy glue. Finally a clear coat is applied to make the paint shine.





Modifications

Panels

You have seen the cars in the panel shop. We worked on the basis that each car would have the same problems. Some did and some didn't but we found that the vast majority of things were the same.

Some needed more replacement panels, so we ordered them. Some didn't need everything supplied, so we put it back in stock. But 90% was common to every car. Modifications were the same regardless of the condition of the car.

By forcing ourselves to schedule all cars in the same way, we only needed to concentrate on the 10% that were different. Our computer system handled the other 90% without a second thought.

You don't get much more apparently diverse raw material than rusting thirty year old cars. But careful analysis shows the operative word is '*apparent*'. If you approach the problem correctly, you can usually find the areas of commonality and convert chaos into easily managed production systems. We did it, so anyone can!

Mechanical

The next slides are for reference and use by those who are trying to solve '*the great restoration puzzle*'. These engines are in original specification.

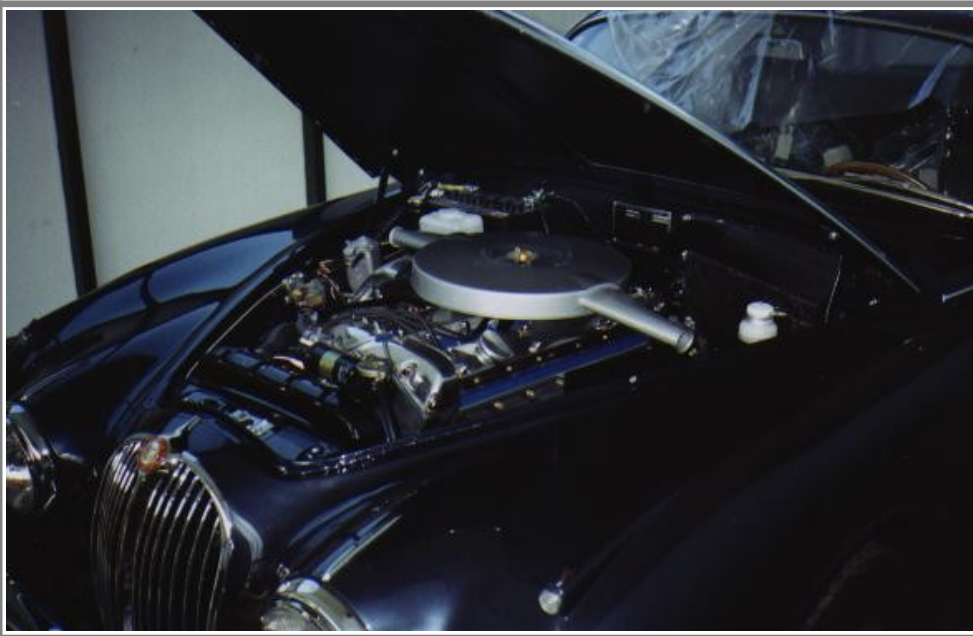
A point to note — there are variations between the left hand drive and right hand drive, due to the location of the steering gear. The 340 was a little different, especially the air cleaner. That's the car business!

By careful analysis you will be able to compare original engines, as shown in this section, with the new specifications that were developed for our Mark 2. Of course, there was continual upgrading, so that makes it just a bit more interesting.

Some cars from the USA had extras which were not on the Standard model. Power steering was also included on some engines.







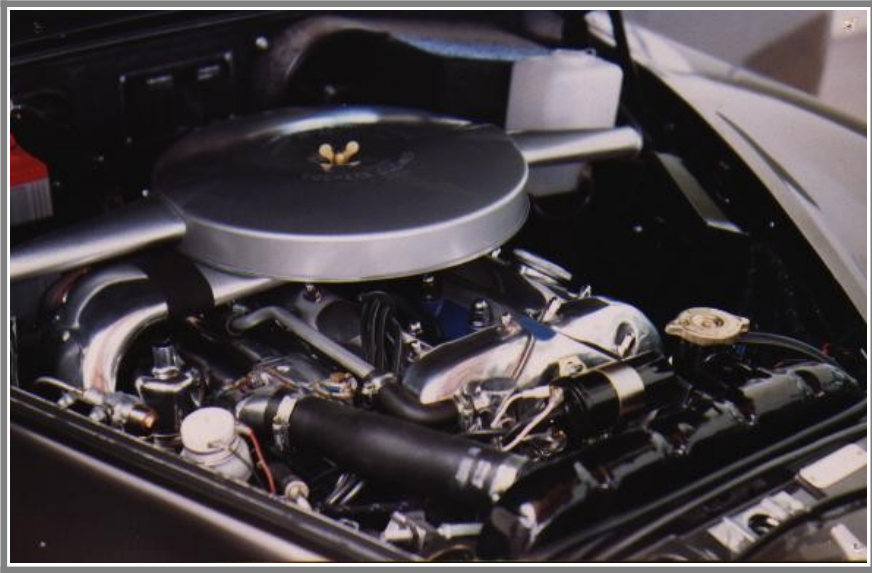
An early car – the glass bowl fuel filter was soon to go

Engine Compartment

The following slides demonstrate the development of the engine compartment over a period of three years. I am sceptical of some of the things we did, but the customer wanted changes and we were in the business of meeting his needs. I drew the line at anything which interfered with safety, and I still hold the view that the restorers who radically change safety critical features are a danger to society.

Bigger engines with more power, together with up-rated braking systems and improved steering and suspension, may seem a good idea to some. But for an unqualified person, who cannot calculate simple stress equations, fitting them into a 30 year old chassis with weld and metal fatigue is just stupid.

We made modifications to the car, but not performance enhancing modifications. I agreed to make one 4.2 litre car only after I knew it was to be submitted to the German standards body, TÜV. At least it would be tested properly!



Things changed rapidly – check the white bottle



The yellow sticker on the air cleaner indicates we had converted to unleaded fuel

Same car, different angle





The long air filter allowed cool air to be drawn in from outside the hot engine compartment



Reflective foil around the air intake



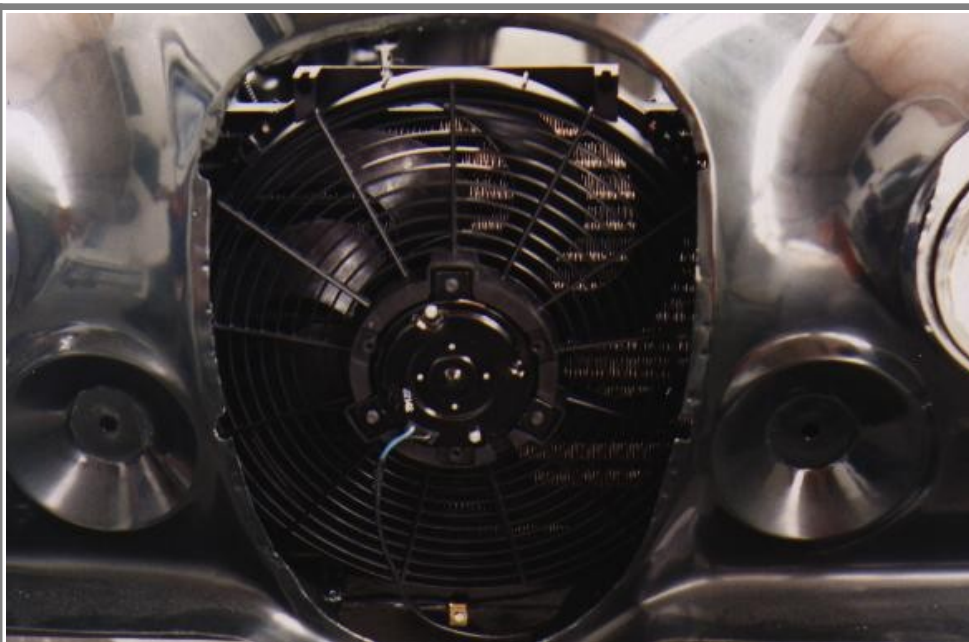
A further requirement from Japan – the firewall and the gearbox tunnel fitted with reflective foil



The electrical relays with the cover removed



The head covers were machine polished to a bright finish



The electric fan grew bigger each year

Conducted Heat

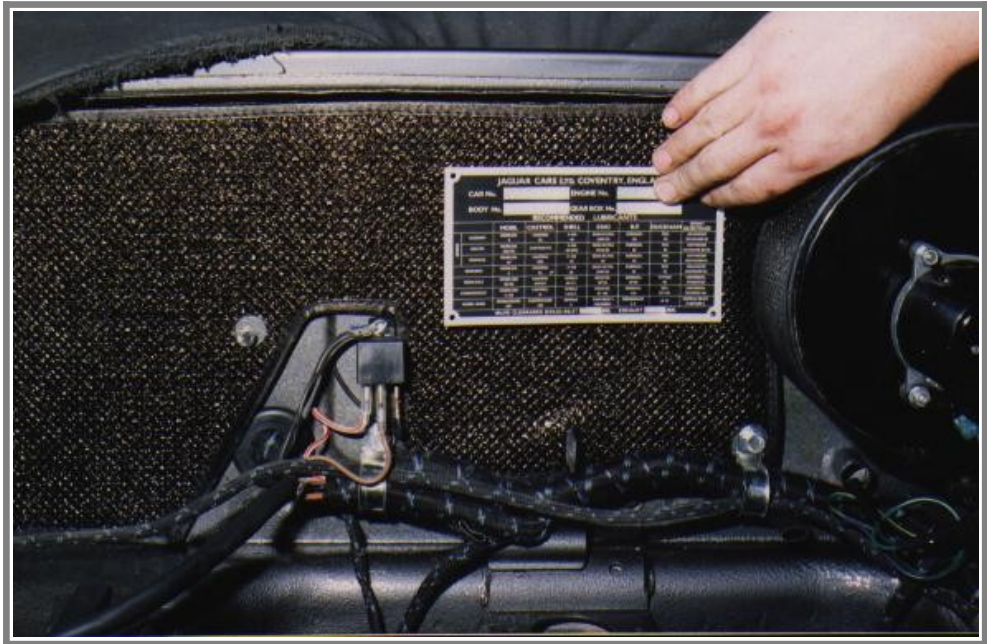
Although these photographs don't show much detail, you can clearly see there were significant changes.

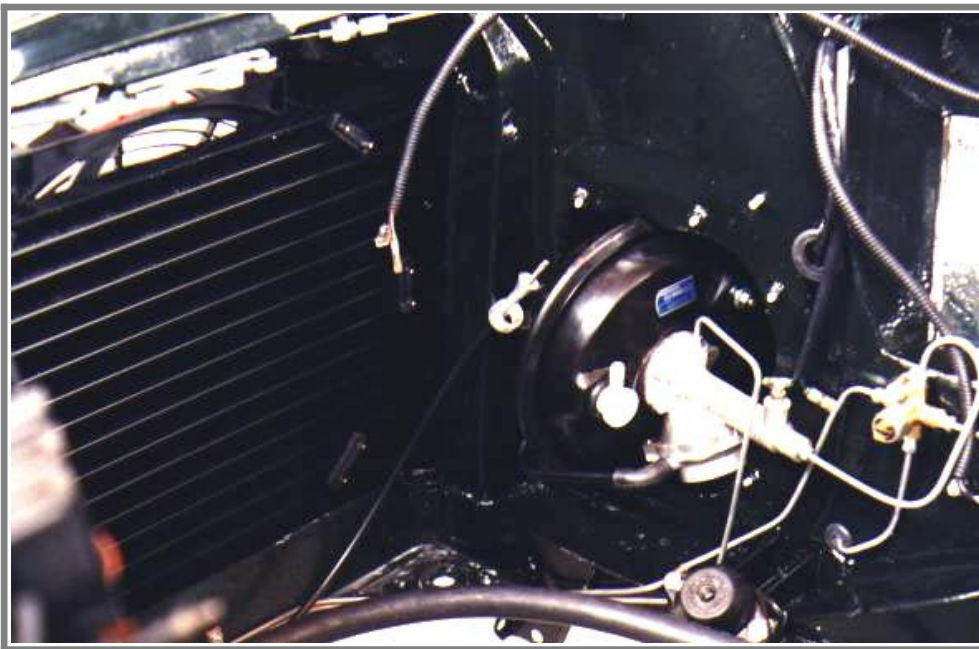
My calculations appeared to suggest the heat build up in the engine compartment was of such intensity that no amount of reflective foil would help. It may only have helped with radiated heat.

Conducted heat was a major problem, given the size of the engine block, bell housing and gearbox. It just had to be transmitted into the cabin and into all the components.

Surprisingly, the most complaints came from seams which had *sprung*, opening up a small gap and convecting warm air into the passenger compartment. So we put in a procedure to seal these in the panel shop.

That's when I decided performance modifications would not be part of our options.



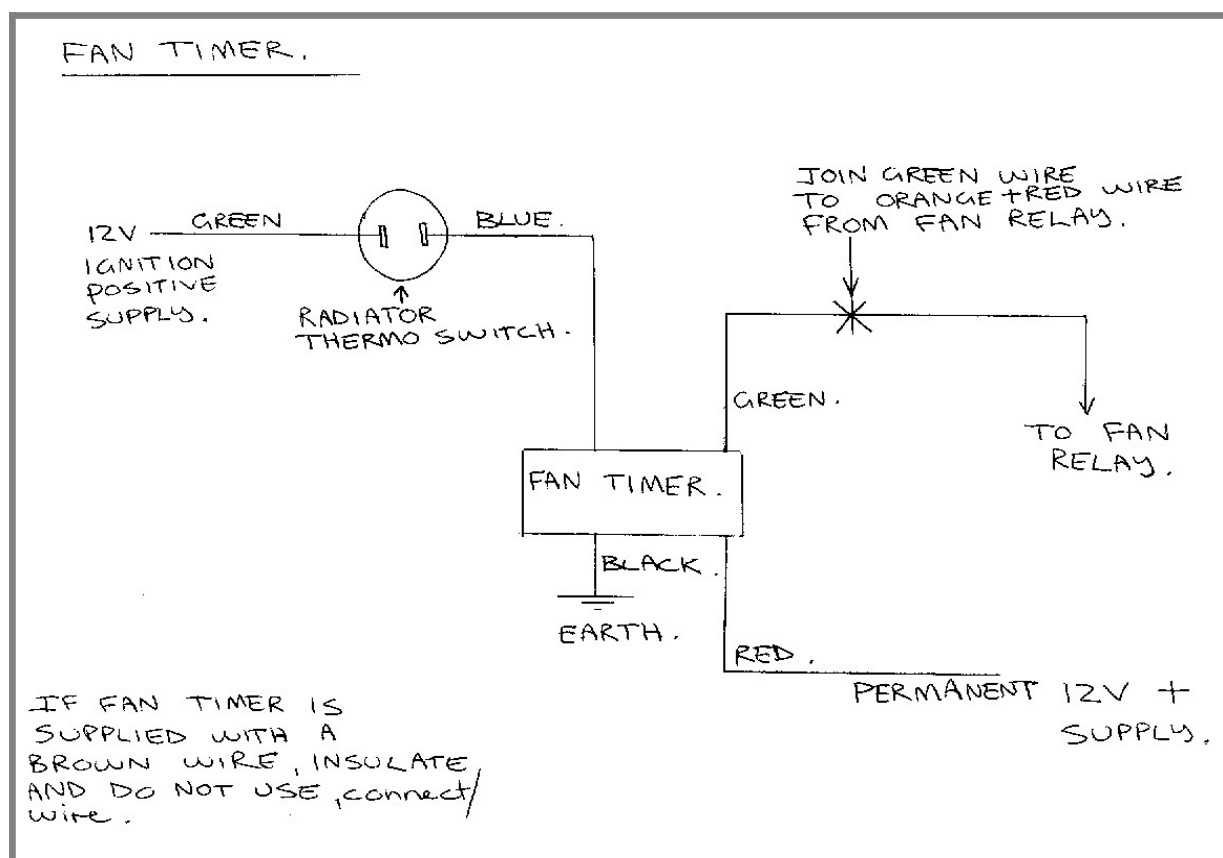


Assembly

I have tried to show how the assembly progressed. Some jobs, such as trimming, are included here but they also have their own section. There are overlaps between the two. Don't forget to cross check with the video.

Assembly took roughly two weeks. Rust prevention was the first task, then the auto electrician installed his wiring harnesses. At the same time the fuel and brake lines were fitted. The photographs will give the general idea.

Parts could be delayed, or even be unobtainable, so the assembly process had to take that into consideration on each car. Interior trimming could generally start any time after the wiring harness was fitted. The engine and gearbox had previously been put into the test car and driven for 1000km to shake out any problems.





The first job after painting was applying rustproofing materials



Modern automotive foams were fitted



Wherever possible, new components were used



Protecting the paint was a major exercise during assembly





The assembly area had two pits, but insufficient room for two cars to move past each other



We had enormous problems with window frames, due to lack of standard sizing. Fitting glass was a major problem.





Some of the early paintwork was so bad the cars had to be hand cut. The paint always appeared to be soft. The paint supplier tried and got the same result, even after checking the measuring equipment. Finally, we changed suppliers.

There is some argument about how long a body should sit before it is assembled. The paint takes some time to fully cure and working on it too soon can cause scratches.



We tried to paint the car on a Thursday afternoon and allow it to sit until Monday. That seemed to work. But other people may have different experiences.





I spent many hours filming the various operations as the cars were being produced. When you see small photos like these it indicates they have been '*grabbed*' from the video.

The main advantage is that it is possible to show things which are totally unknown to Kodak, Fuji or Agfa. The videos contain so much information it is difficult to know what to show.

On the downside, the detail is lost, due to the low resolution of the video systems (I used both PAL and NTSC). But they have a part to play and I hope they enhance your understanding.



The engine compartment of the Mark 2 is fairly cramped. It is not intended for major modifications, which take up some of the already scarce space.

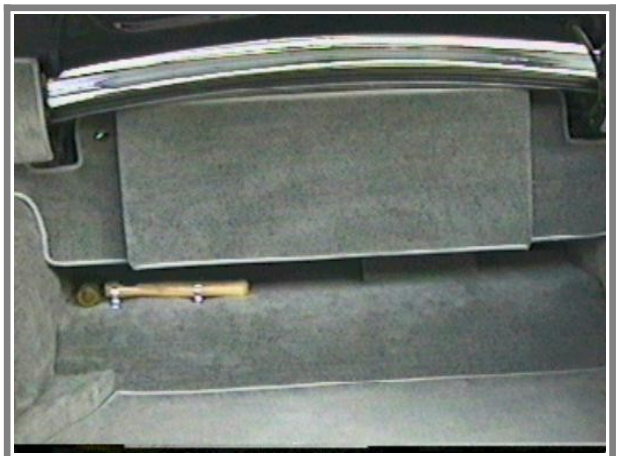
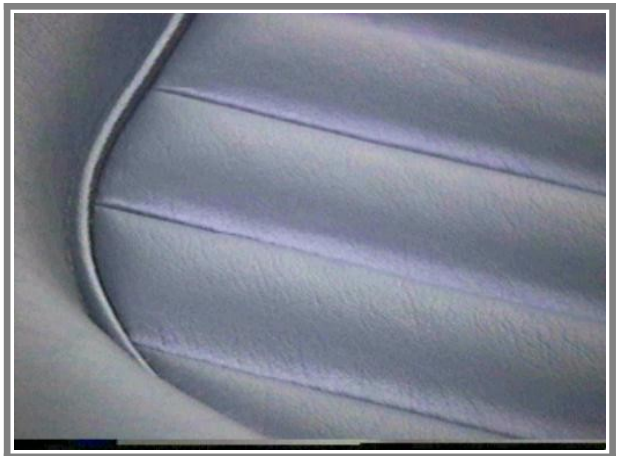
I have to give credit to the mechanics who developed assembly techniques under quite difficult circumstances. I don't think I ever saw cuts and abrasions caused by trying to fit hands and fingers into spaces where they were clearly not designed to go.

It may take a little thought and some valuable time, but on any restoration job you should work out how to get into things before you begin the development. It saves a lot of pain and some very bad language!



Door panels were originally made from vinyl (plastic). We had a request for leather and we found the cost was not as high as we had feared. I make the assumption you are aware the Mark 2 seats were leather from when it first hit the market.

There was nothing so enjoyable as opening the door and being assaulted by the smell of new leather. I believe in Japan the cars were kept airtight in the showroom, allowing the odour to increase until the customer came along. Then the doors would be opened, the smell released, and the salesman handed over the pen to sign the sales contract. Such is the power of leather.



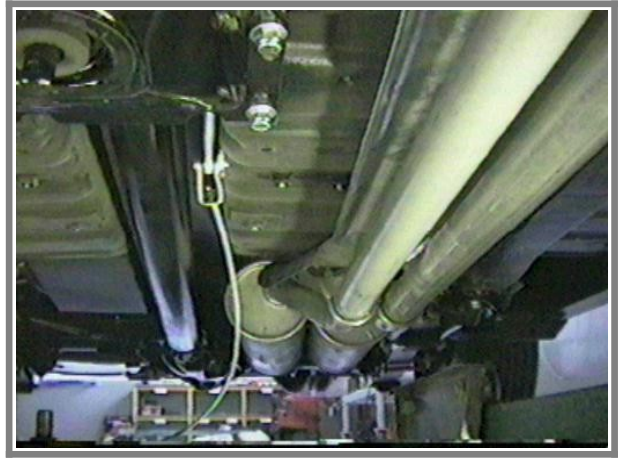
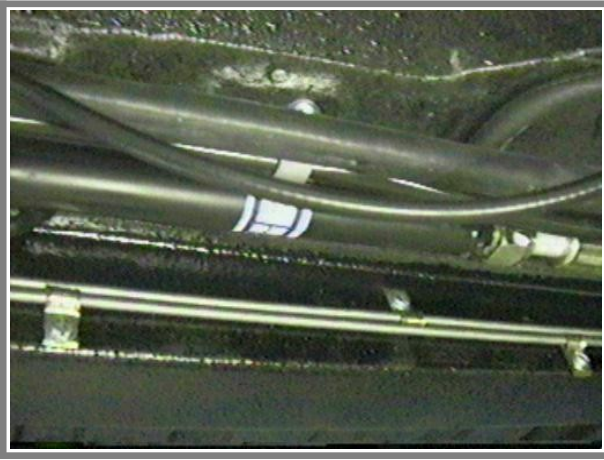


Initially we imported complete trim kits from England and the USA. Staff suggested we could do better by manufacturing most of our own trimming components. I agreed and we set everything up.

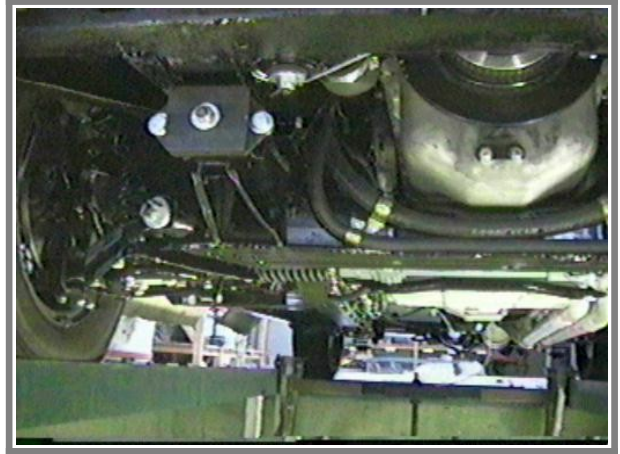
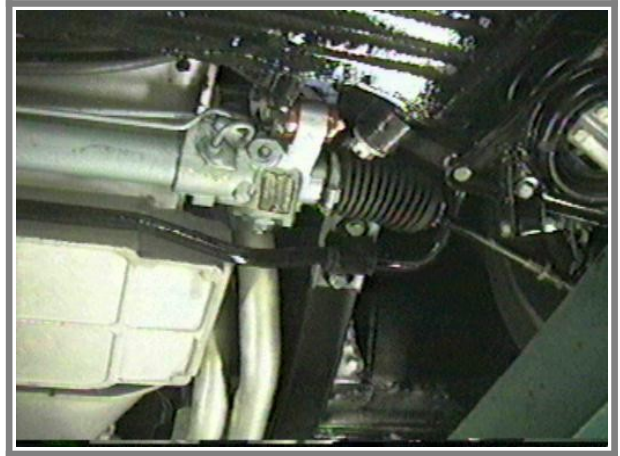
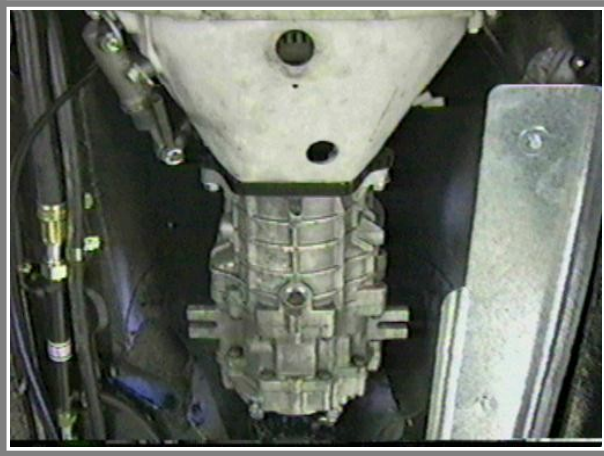
We had superb quality, which was unobtainable anywhere else. That was a strength. But, on the other side, it leaves you vulnerable to staff who go off and set up their own business. I would be reluctant to set up such an operation again unless a pool of good workers was available to fill vacancies.

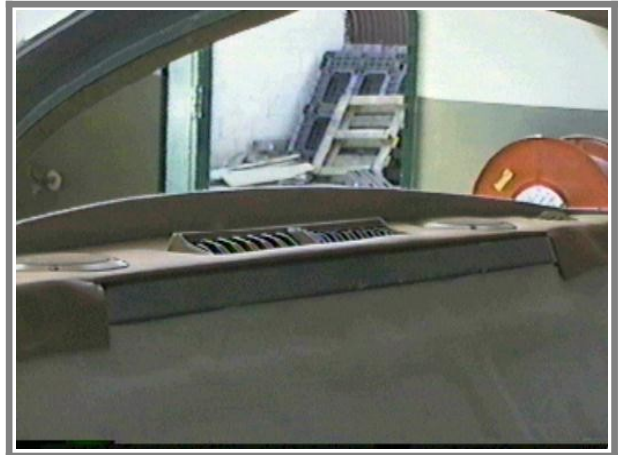
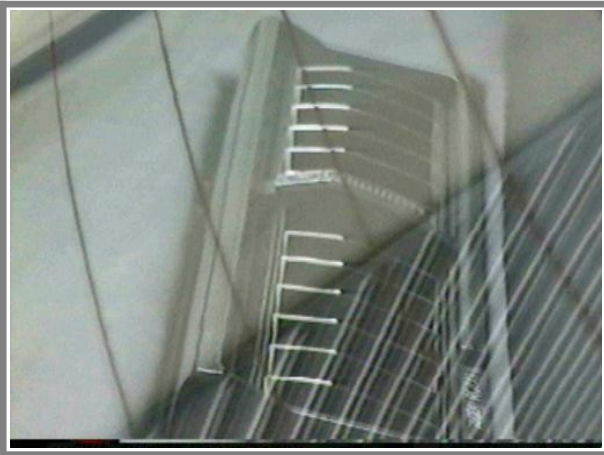
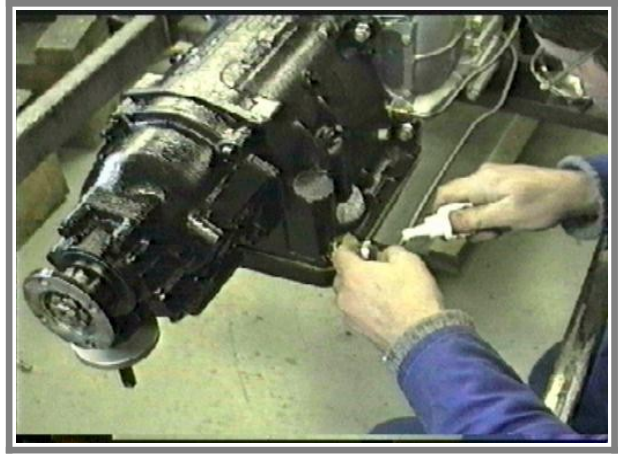
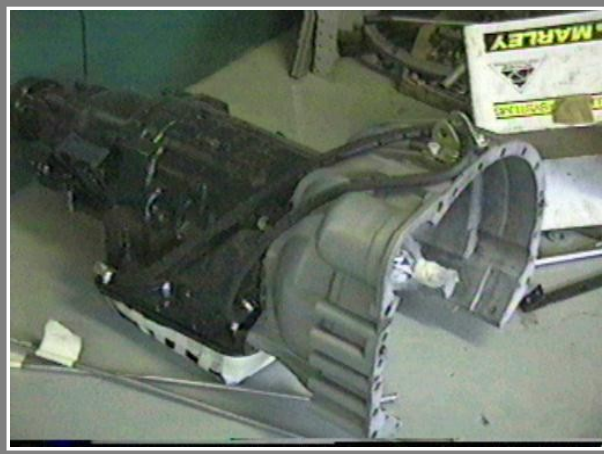
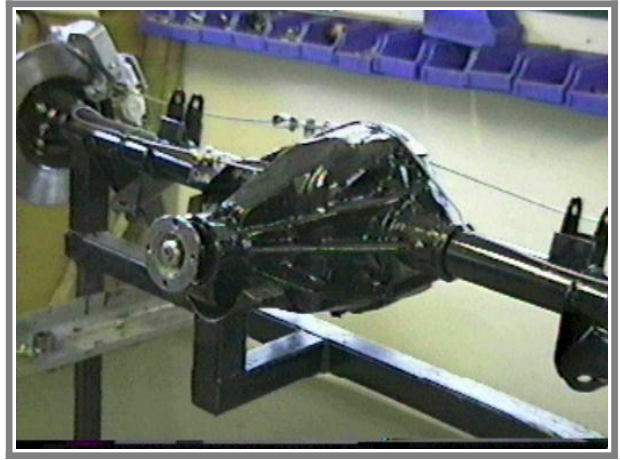
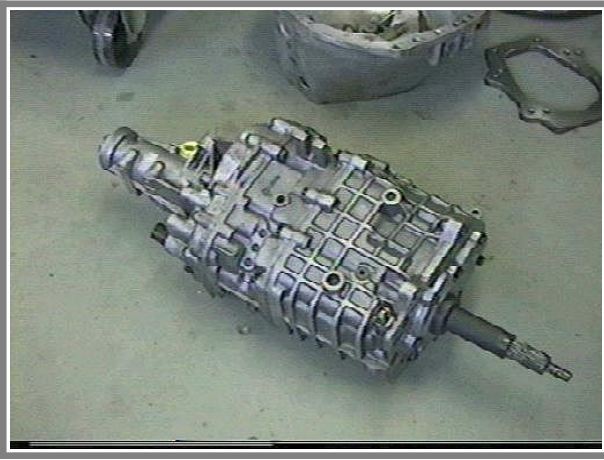
You'll see more of the trim section later.





Here are some of the modifications that were made under the car. Return fuel lines, heat shields from the exhaust, fuel coolers and air-conditioning hoses are evident.

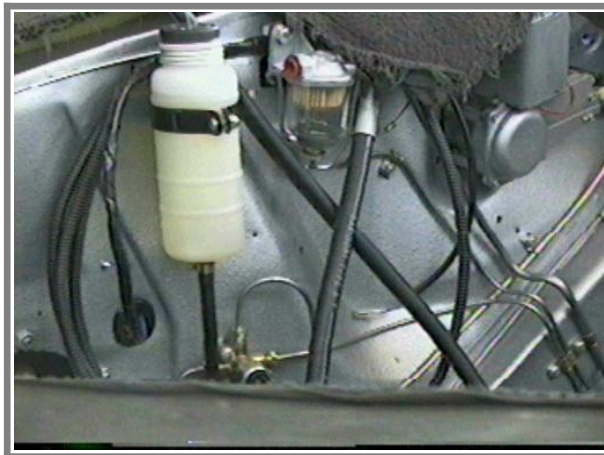
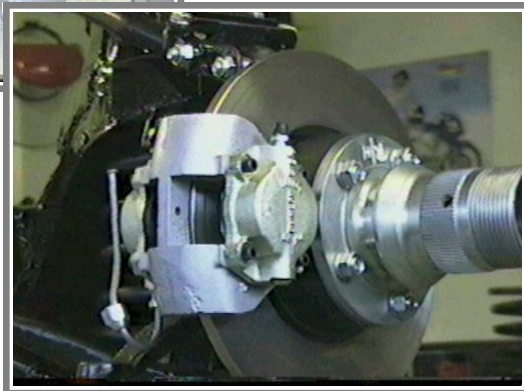
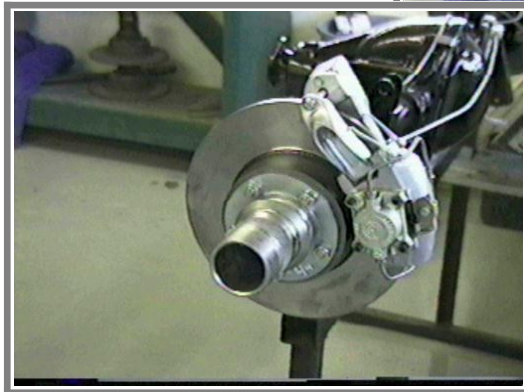
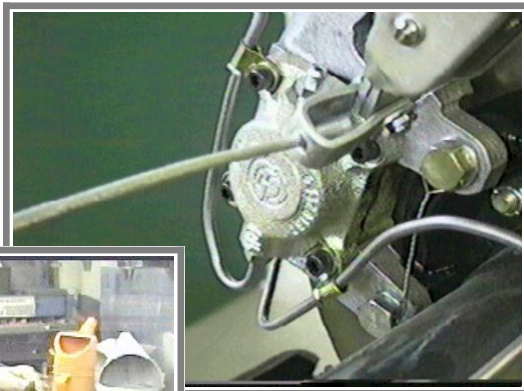


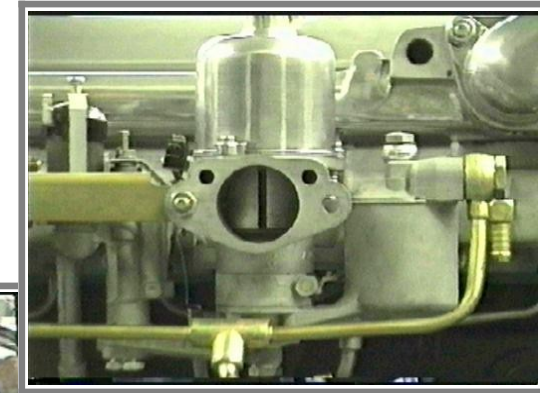
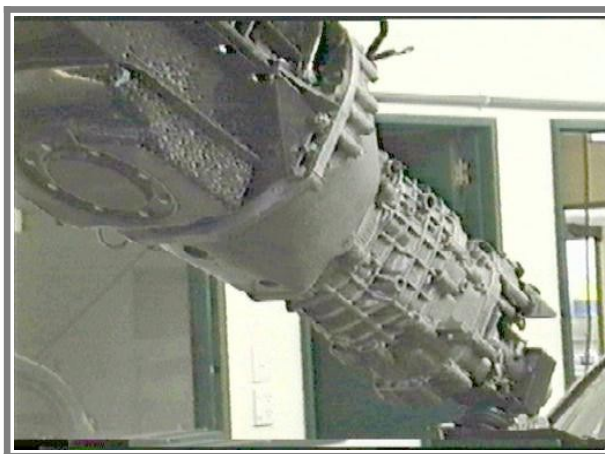
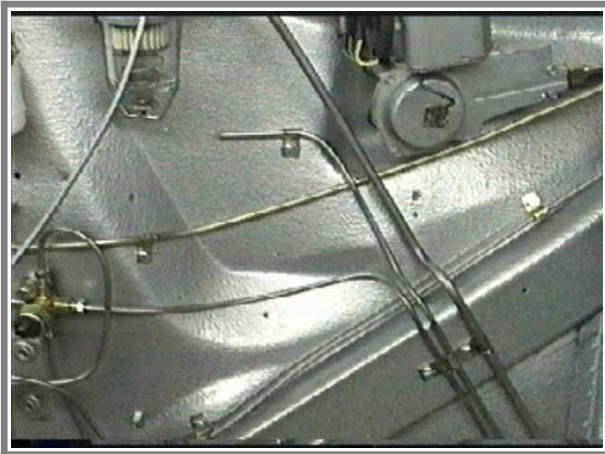
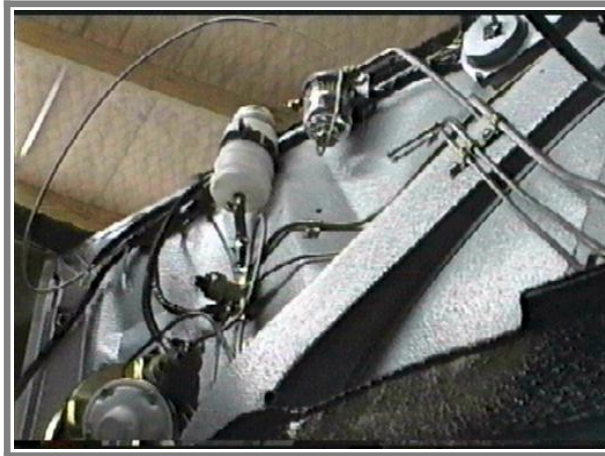
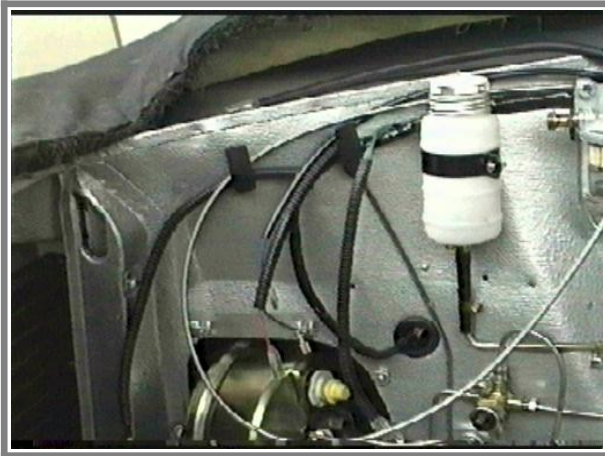


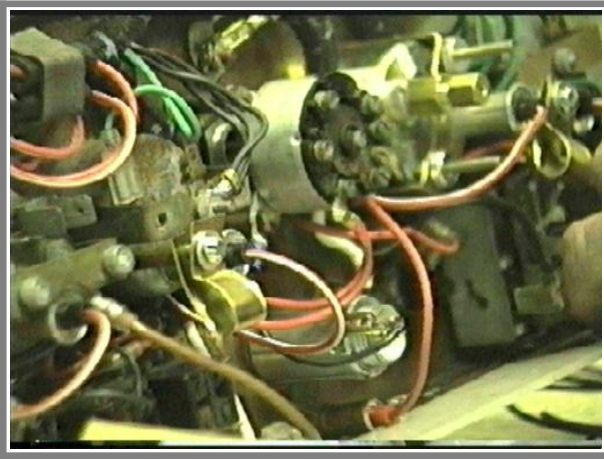
Everyone and their dog has a foolproof air-conditioning system for a Mark 2. Well, just ask them to do a heat balance equation and see where the heat comes from and where it goes.

Most of the systems, if they worked, would defy the laws of physics. But it makes no difference. Everyone and their dog just knows their system works, even although they don't know what a heat balance equation is.

I'm happy to admit we developed the air-conditioning system over 50 cars. I'm a little sceptical of those who could do it on the first try!



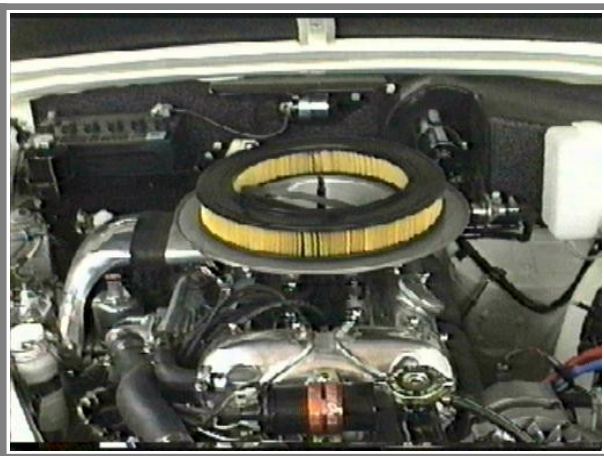
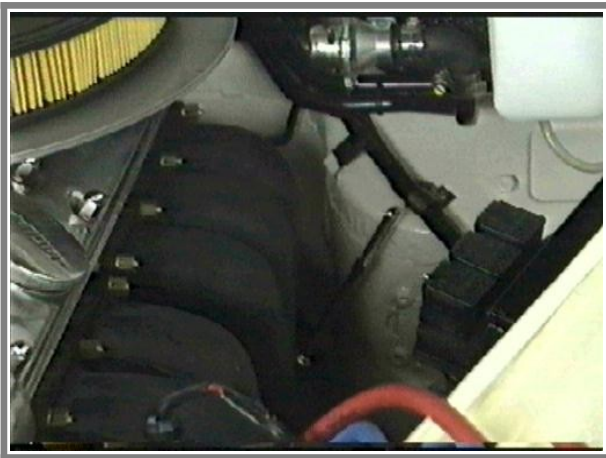




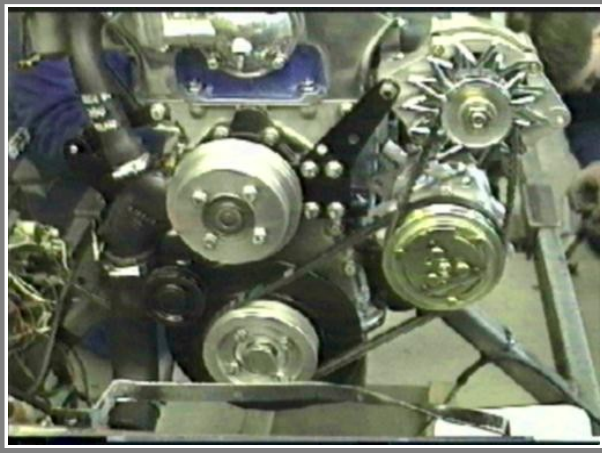
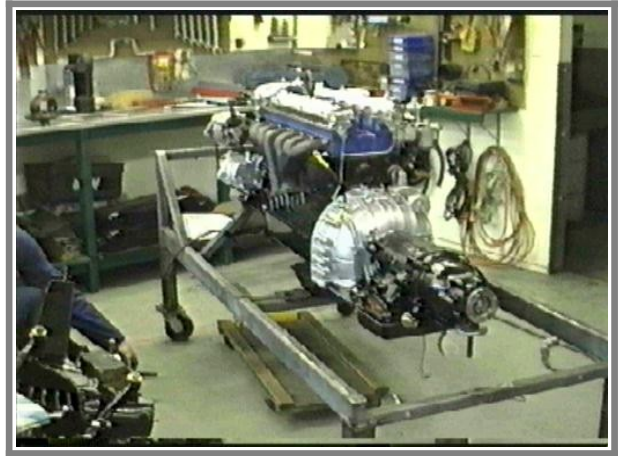
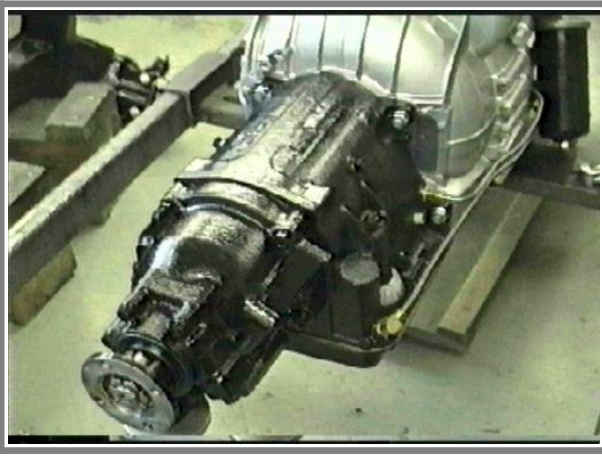
The electrics on the original Mark2 were fairly basic. The system was upgraded, the main improvement being an alternator instead of a generator. Electronic ignition meant new circuits had to be installed.

We improved just about everything, except the clock in the instruments. It is a fact that everyone just accepts it will stop functioning after a short period of time.

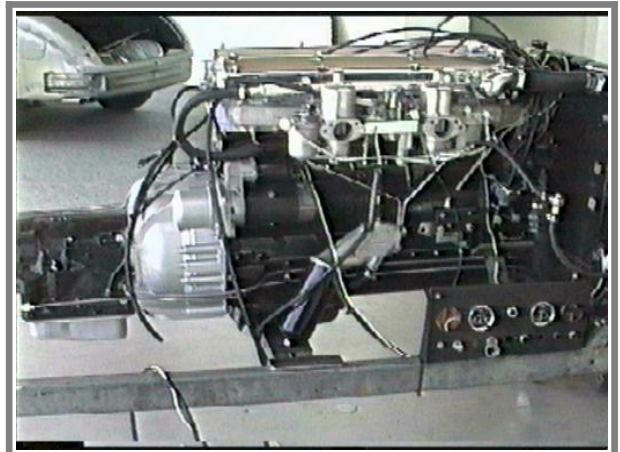
As with air-conditioning, there are wonder solutions, but they seem to have bypassed me!



This is the engine before we began using the air filter from the 340 model. The round "pancake" filter did seem to restrict air movement and help the temperature rise in the engine compartment. It may not be the case if the modifications are not carried out.



Gearboxes were a serious problem for us as the originals were less than successful. Using a model from a later vehicle offered the best chance of fulfilling our objective that the car would not break down.



The engine test stand was used to set up the engine, which then went directly into the test car and was driven 1000 km by the same mechanic. If he got it wrong and broke down he had only himself to blame. It never happened. The cut off was 400km. If we got to 400km with no problems then it went on forever.

Trimming

Trimming is a highly skilled job if you want to be at the very top of the quality tree. Initially, we used complete trim kits made in England and the USA. The quality was not at a level to make our Japanese customers happy. So the staff suggested we do the whole thing ourselves, and this worked well.

We set up the section as you can see in the next few photographs. There are all sorts of mystical qualities about leather, or so I'm told. There is also great emphasis placed upon supplier accreditation by major manufacturers. I looked into it in some detail and concluded it was just a form of snobbery.

The product needs to pass the test you need it to pass, not those of a major car company half the world away. They dramatically over-specify just in case they are hit with law suits for a batch which had a problem.

I have the same thoughts about ISO9000 quality standards. Only people who can't manage to produce top quality need to use it. Anyway, you can produce very bad quality but, as long as you adhere to your procedures, you meet the ISO9000 series standards. Sick, isn't it?



You need a really steady hand to produce work like this



Our staff even built the benches themselves. This meant they could build them exactly as required for maximum efficiency



The beginnings of an arm rest



A more developed arm rest

Leather

The original Mark 2 had leather seats and vinyl door pads. We needed to produce all leather cars for certain markets. As these slides progress you will see the leather introduced. How can you tell? It's easy! Vinyl can be moulded, but leather cannot (at least not by us). Check out the horizontal lines in the door pads.

These photographs were taken at regular intervals. They are completely representative of what we produced. There are no bad photos that have been omitted. I have to give it to our trimmers. They were quite superb at what they did.

And I must give myself some credit as well. I didn't ever interfere, and they just got on with it.

OK, so maybe I got the Prime Minister to come to the factory and present them with an award, and maybe they were seen a couple of times on National television. Yes, and maybe they were in the glossy magazines and the newspapers. But, other than that, I just let them get on with it.

I just love motivating people by not interfering in what they are doing!



An early car – flat seats and vinyl door pads – no headrests



Open the door and smell that lovely leather!

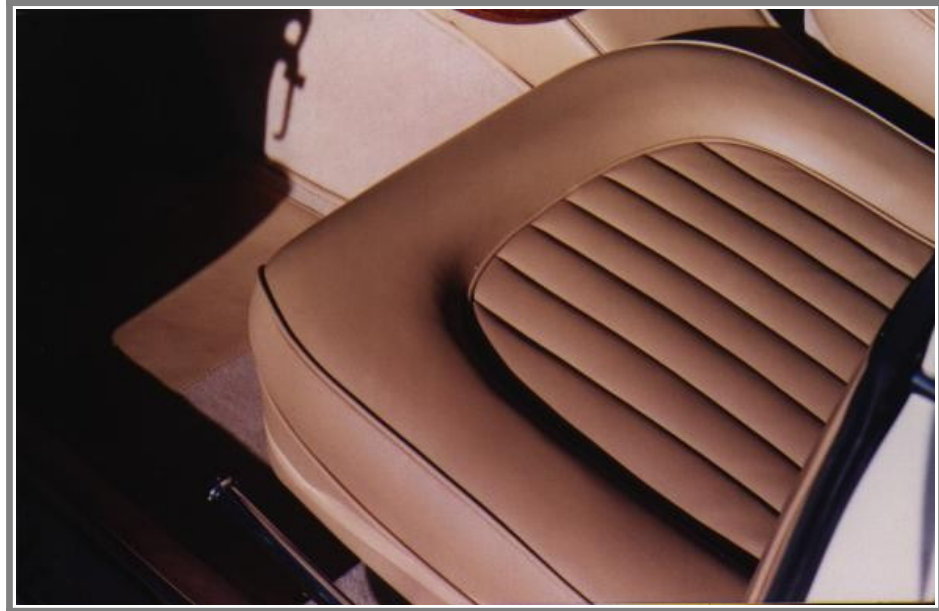


One hundred percent vinyl



A typical early car

Carpets were wool, imported from England at great cost. Polyester was cheaper but not acceptable to the customer



Picnic trays hide on the rear of the seat. You'll see them later.



The very first car with
contoured seats for better
support



The deeper seats were for
the Japanese market.



A hybrid car – leather with
locally made vinyl door pads



Nice, isn't it? At least in some part of my life I've done something worthwhile



Another colour – same quality



Keeping the leather clean could be a problem. The panel beaters had so much steel on their overalls we could lift them up with an electromagnet!



Check out the door pad



A continuation of the
previous slide



One of the last cars before
headrests were introduced

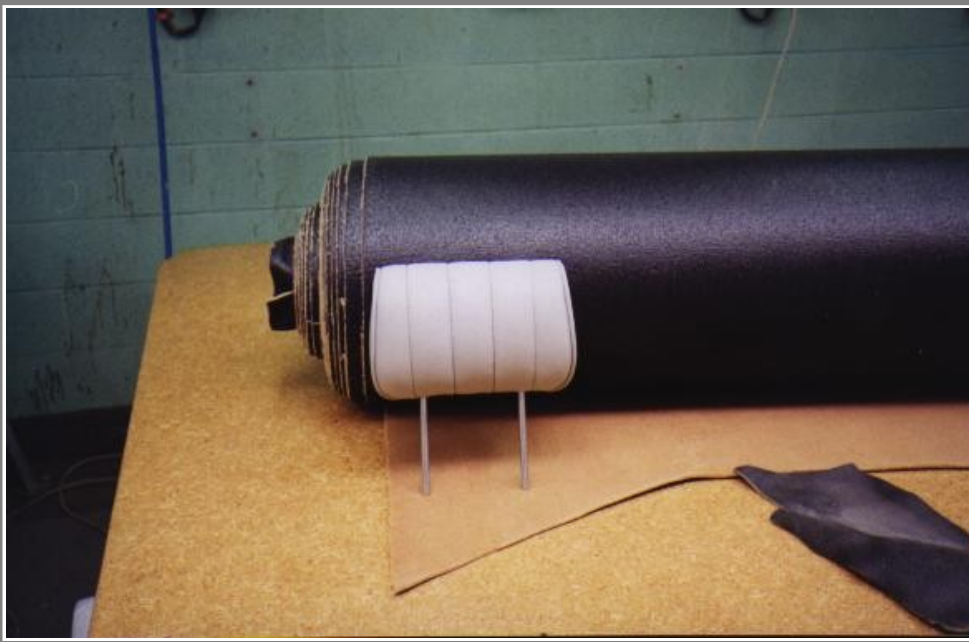


A further colour combination

The picnic trays were replaced with commercially available veneered plywood — maybe not original, but hard wearing!



Rear seats were restored with new automotive foams. The frames were treated exactly like the rest of the car — totally restored, treated and painted



It would be wrong to tell you where the headrest came from. We needed an approved model, and somehow this appeared. We shipped them all the way back to Japan.



The interior of the seat was modified to take the support mechanism.

We followed the method used by the new car manufacturers.



Burred walnut veneer was used in the Mark 2.



A contractor did the re-veneering and we polished and lacquered.



The wooden dash was always a favourite with Jaguar enthusiasts.

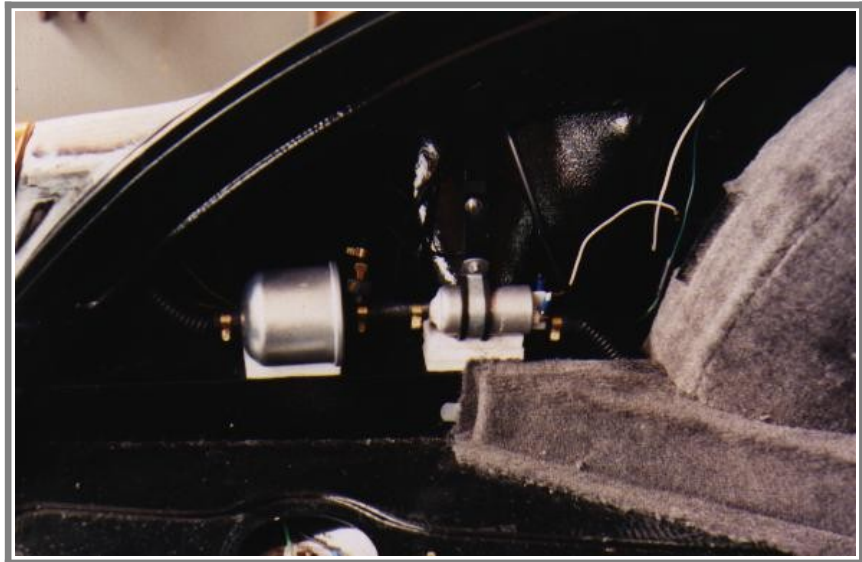
We tended to use lighter wood veneers wherever possible. With the original biscuit leather it was unbeatable.

Mechanical Modifications

The Fuel Pump

You will have seen modifications in some of the photographs. The main items were power steering and air-conditioning. But there were hundreds of other things where the original car was improved from Jaguar's specification. In the next two slides you will see the fuel pump and filter.

Jaguar's famous fuel pump made a very distinct ticking noise. It was also less reliable than the modern equivalents. We started off repairing the originals, since there was a feeling that originality was what the customer wanted. In fact, they wanted a status symbol and reliability. Originality was to be only cosmetic.



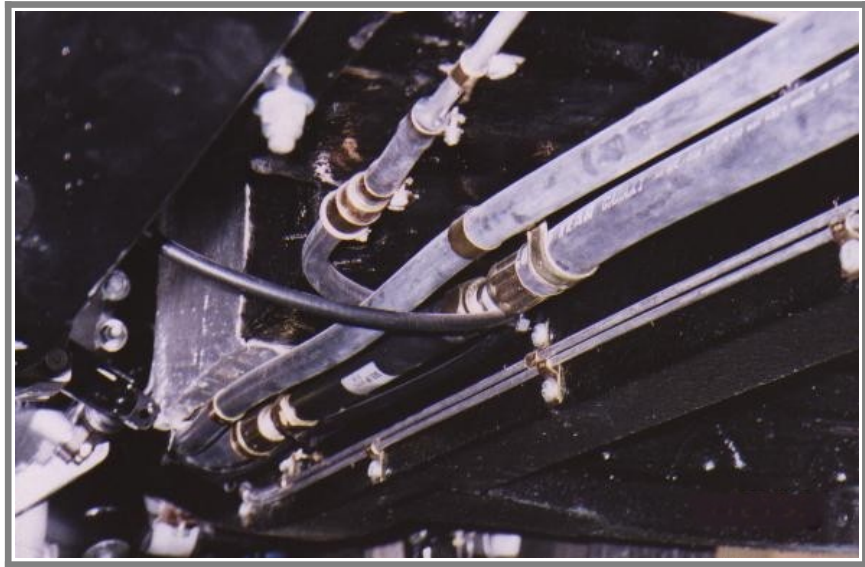
So we changed the mechanical pump to an electric pump and had no further problems in that area.

The Fuel Filter

You can also see the fuel filter. The original filter was a glass bowl located high up in the engine compartment. Heat rises! And so the fuel filter became very hot, introducing vapour locks into the fuel line. The result was no fuel to the engine.

Once again we tried to be original, and the complaints continued, especially in hours of stop-start traffic at 35°C. It was a tow truck driver's dream!

So we looked at what was being done on present day cars and installed a similar system. We also fitted the XJ6 fuel cooler into the air-conditioning line. The problems, and the tow truck drivers, disappeared.



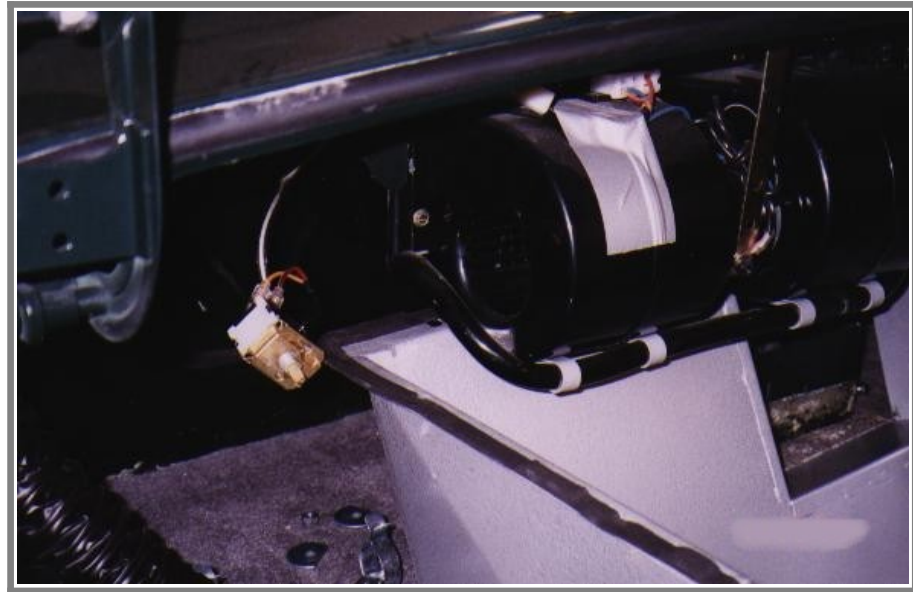
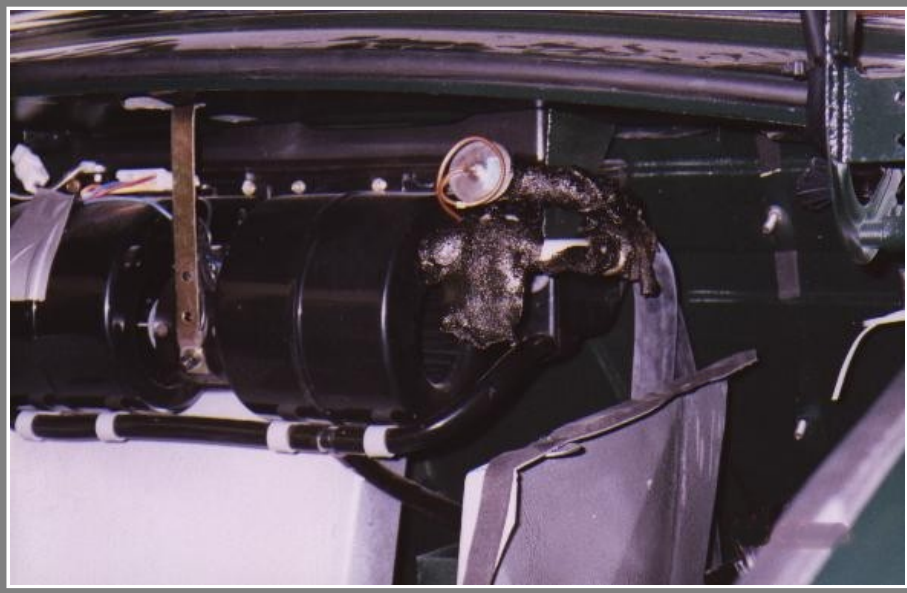
A return fuel line was also incorporated and the minimum amount of exposed fuel line was utilised in the engine compartment. In this way there was always cool fuel being piped into the carburettors and, even if they were really hot, the fuel still did not reach critical temperatures before going through the jets.

Air-conditioning

The question most often directed to me was “How do you fit air-conditioning?” I had to explain that it required a great deal of experimentation, remedial work on the car, and working to quality standards which most people would find unnecessary. Even a very small gap in the firewall can let in enormous amounts of heat.

And the air-conditioning system was used to provide fuel to the carburettors. The air-conditioner required a very special type of alternator, not just a high powered alternator. It went on and on. Our Mark 2 developed as a technical entity in its own right.

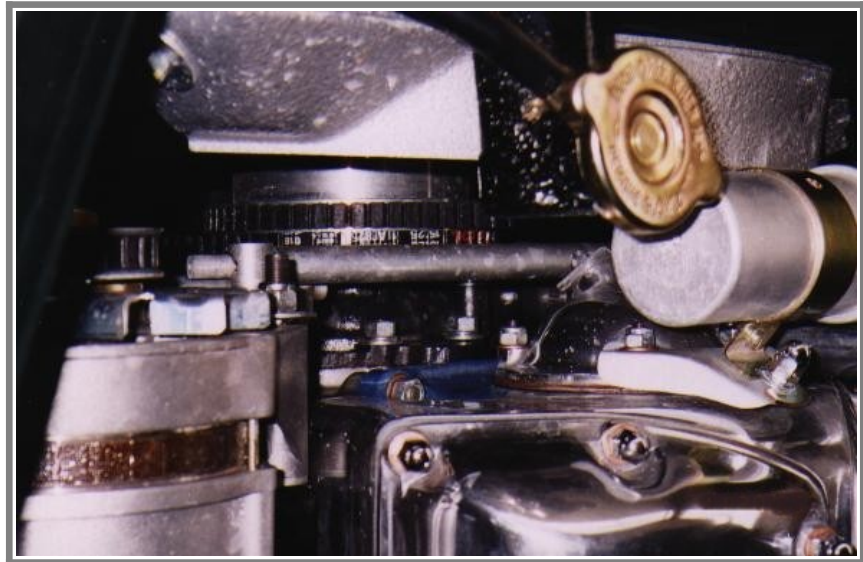
That was the difference between what we did and what everyone else does. In effect, we designed a car, except that we didn't have the resources to build a new car, so we used an old one. That greatly reduced the amount of development work.



Alternator

The total amount of power required by the car in the advanced modified state is quite high, but not unusual by present day standards. Our new systems were some-what inefficient, and that was simply due to the original Jaguar design. We had to operate at higher engine compartment temperatures than modern systems. Everything was good at 3000 revs. It was not good at 700 revs.

The need was for an alternator that had a high power output at low engine revs, specifically to deal with such problems. Only two alternators met our specifications. The Japanese found a Delco-Remy, which was only available in refurbished form and difficult to obtain. We found a Bosch model which was currently in use on the Ford Falcon and Ford Fairlane in Australia.



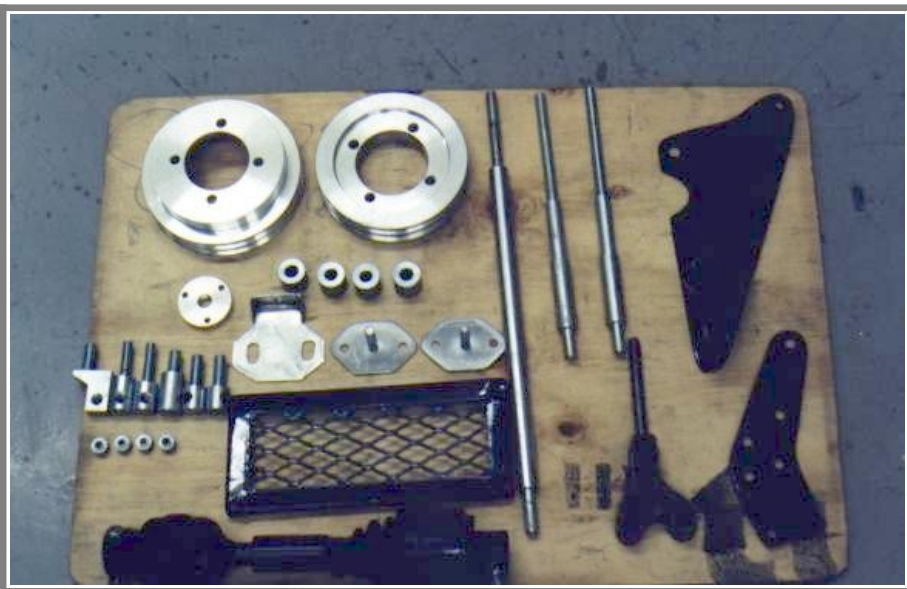
Few people seem to realise why only those two alternators would work in our car. The experts will tell you about high powered units which are guaranteed to cure all problems. They should take a look at the manufacturer's output graphs for low engine revs and form their own opinions. The problem is when you are stationary, not when cruising down the motorway.

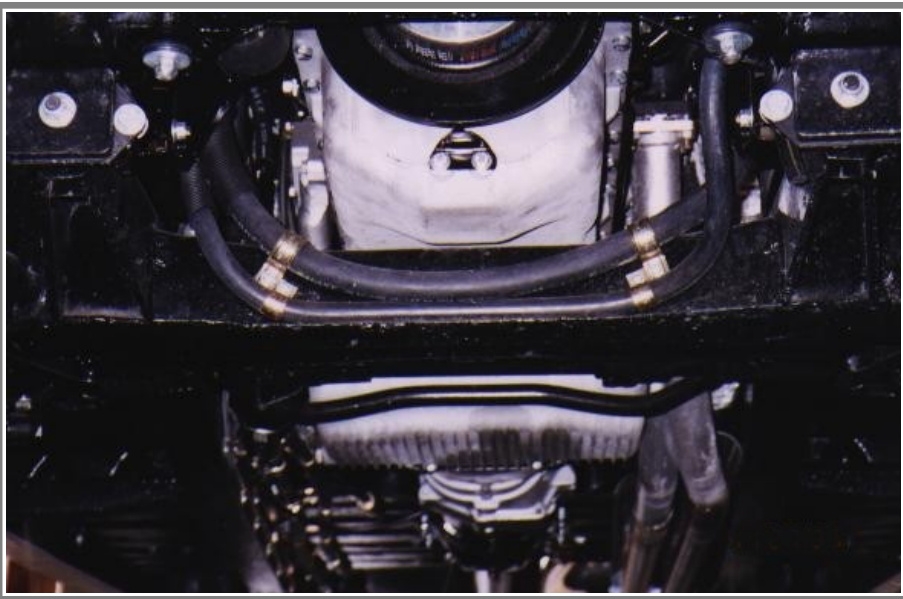
Special Parts

Here are just a few of the special parts we had to manufacture for the car. Machining pulleys etc. is not a cheap thing to do. I'm sure you realise that we only did this when there was no alternative. The pulleys were designed to provide suitable ratios for engine revs, alternator speed, power steering pump and the air-conditioning compressor. Changing one item, such as the alternator, meant the pulley ratios would be less than optimal.

And how does all this affect the basic balance of the engine? Could we end up with a banana shaped crankshaft? Modifications of this type require some really serious thought.

Fooling around with cars is great as a source of enjoyment for car lovers. It's great fun and you learn a lot. But for a business it has to be done correctly, because the business has an obligation to the customer.





Fuel Cooling

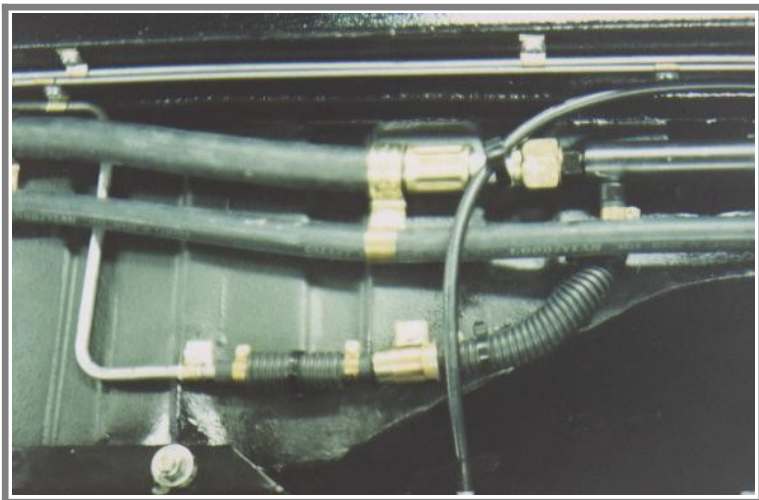
The fuel cooler is just a miniature heat exchanger which utilises the cold air-conditioning fluid to extract heat from the fuel. That, in itself, puts additional strain on the air-conditioning system, requiring bigger components and greater power, hence the specific alternator requirements.

Power is not generated out of thin air. The engine has to produce the power in the first place. But at low idling revs there is no natural air flow to assist with cooling. The solution is to install a big electric fan to keep the engine cool. Guess what? That needs more power still!

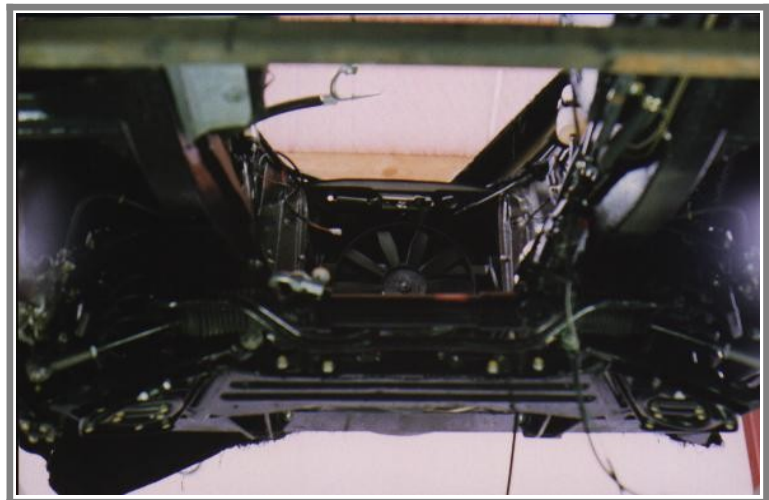


By now, I hope you are beginning to understand the interdependency of all the components. We were quite scientific. In a business sense you can expect the same benefits from your development work.

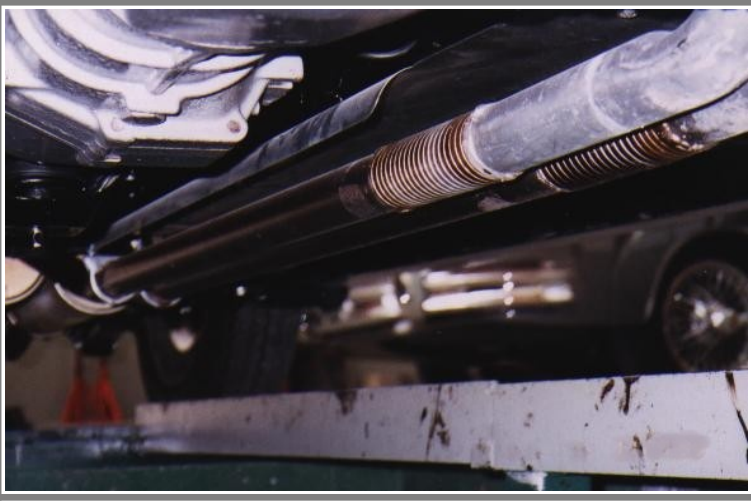
Small businesses have little time and money for development work. That is what makes it so valuable to you. Your competitors may copy your general design, but they don't know the underlying reasoning behind your decisions. So they produce copies with fundamental flaws and, over a period of time, they enhance your reputation of quality and reliability by their own comparative failure. You might even drop a few red herrings to assist them!



An early attempt at the fuel cooling location



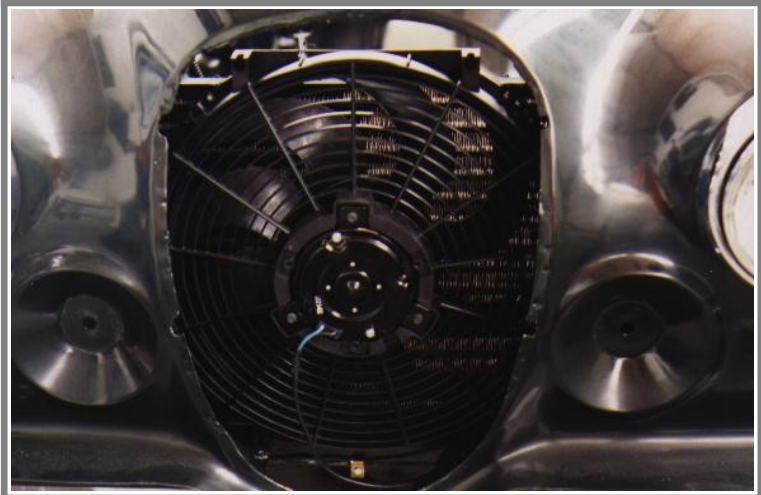
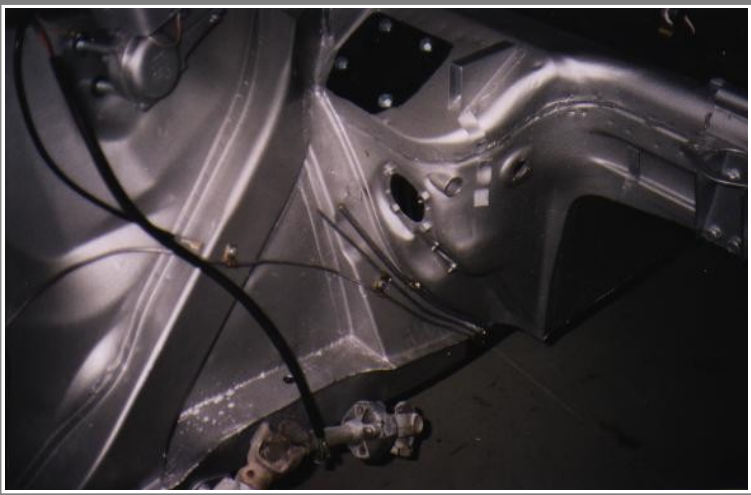
A car with an early model electric fan during assembly



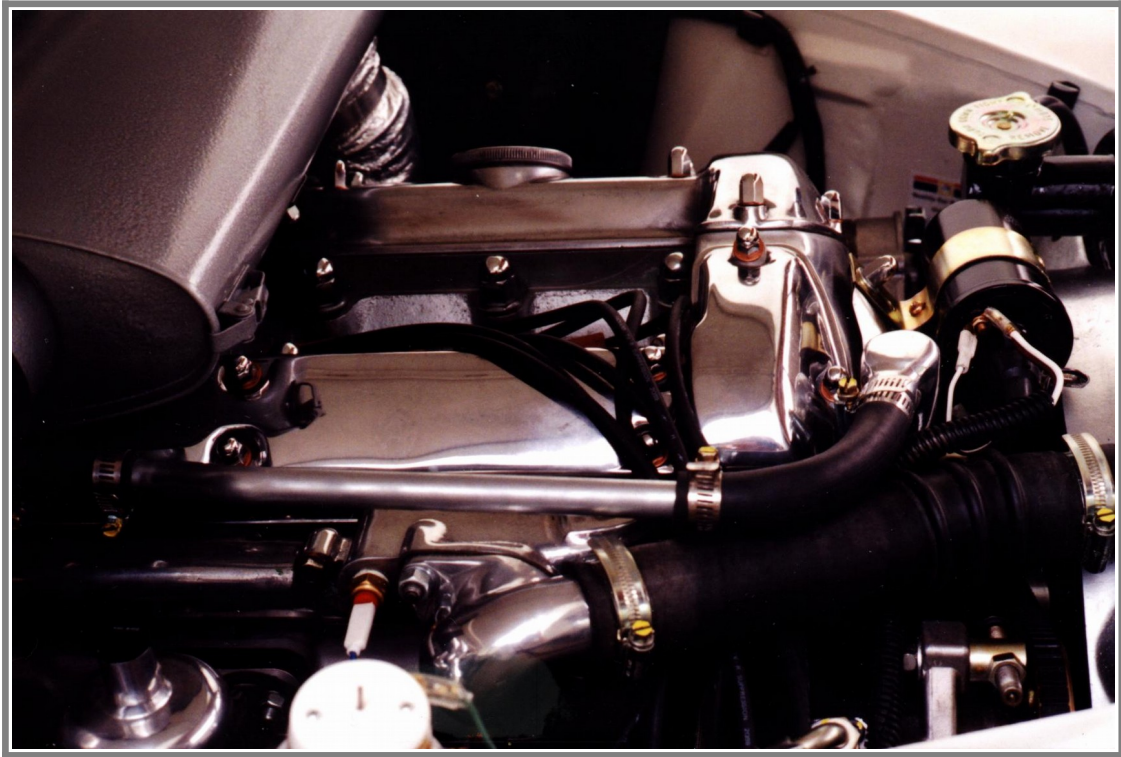
A heat shield over the exhaust, but we never were able to ascertain if it was really effective or not



The brake booster changed several times over the years



Finished Product









Accounting Notes

These notes were designed to allow people to understand the properties of our accounting package, in the event that they might want to undertake a similar project. The business considered that accounting was a production tool, the purpose of which was to provide systems and data for efficient shop floor operations. Any benefits on the administrative side were just a bonus!

We used a package bought in the USA, but similar items are available everywhere. They are low cost, fully integrated accounting packages with facilities for producing assembly (or Bill of Material) lists/transactions for small manufacturing companies.

The modules built into the package include:

- General Ledger
- Cash Ledger
- Payables Ledger
- Receivables Ledger
- Inventory

Some systems will also include a Payroll system that can be integrated into the General Ledger and this is very useful if it is available.

The systems usually come with sample Charts of Accounts for different types of business. With the sample as a starting point you can then build up your own Chart of Accounts to suit your particular business.

The General Ledger Module

The General Ledger module can be used on its own, but it is really much better to make use of the system's full integration and work through the payables, receivables and cash ledgers for your accounting purposes. In this way, your Balance Sheet will always balance and you will be able to produce an accurate income (or revenue) statement, which can be used for all your statutory reporting at year-end.

The General Ledger also allows you to:

- create Journal Entries of items that need to be moved from one account to another - for instance, when you wish to move a Work in Progress item from your Balance Sheet to the Cost of Goods account in your Income Statement. To do this you simply credit the Work in Progress account and debit the Cost of Goods account (making sure they are for equal amounts). A sample of a General Ledger transaction is shown.
- add payroll costs to your system if you do not have an integrated package with a payroll module.

The Cash Ledger

The Cash Ledger allows you to keep accurate banking records – whenever you make or receive payments these are entered into the cash ledger. You can mark off cheques as they have been cleared through the bank so that you can always reconcile your bank accounts. The Cash Ledger is also used to capture bank charges for such things as cheque clearing fees, account fees etc.

The Payables Ledger

When you first set up your system it is a good idea to work out some Purchasing Codes – a sample list of Purchasing Codes is shown. These Codes are linked to a General Ledger account (taken from your Chart of Accounts). You will also need to create a list of all your suppliers and the terms offered to you (this will probably include the credit limit that has been imposed on you).

The Payables Ledger allows you to :

- create purchase orders
- enter the supplier's invoice against the purchase order
- add goods to Inventory (stock)
- charge services or work in progress items directly to the balance sheet or income (revenue) statement
- keep track of payments due to suppliers

The Receivables Ledger

When you first set up your system it is a good idea to work out some Billing Codes – a sample list of Billing Codes is shown. These Codes are linked to a General Ledger account (taken from your Chart of Accounts). You will also need to create a list of all your customers and the terms you are prepared to offer them, complete with their credit limit.

The Receivables Ledger allows you to:

- create invoices for goods and/or services you supply to customers
- create delivery notes to accompany the goods
- remove goods from Inventory (stock)
- keep track of payment due from customers
- charge the customer interest on overdue payments

The Inventory Module

When you first set up your system you will need to create a list of every item you intend to keep in stock. This list will include the location of the item.

You can code your stock items so that, for instance, finished items (say a bicycle) would be Code A, the large parts that go into the bicycle would be Code B, and the very small items (the nuts, bolts and screws etc.) would be Code C.

The Inventory Module allows you to:

- keep track of all stock on hand and its value (based on current cost, or average cost, or standard cost – you and your accountant can decide what is best for your business);
- see stock movements and work out which items may be slow moving or have not moved, thus allowing you to offer them at a lower price and bring in quick cash;
- create Bills of Material (or Assembly lists) to build end products;
- produce lists of stock you need to purchase (via a Product Alert Report)
- create Count Sheets for annual or other periodic stocktaking purposes.

Month End

At Month End you can produce a number of reports –

- a Trial Balance,
- a Balance Sheet,
- an Income Statement (showing profit or loss for the month and year to date),
- an aged creditors list (that is, a list of all your suppliers with

the amounts you owe them and when the amounts are or were due for payment),

- an aged debtors list (that is, a list of all your customers with the amounts they owe you and when the amounts are or were due for payment),
- a complete stock transaction list, showing quantities and values on hand,
- many other reports to suit you, as most systems will allow you to create your own reports. For instance, you can create a cash flow report for the coming month, allowing you to accurately work out your cash requirements.

Month End Closing — some systems will require that you close off at the end of each month, which means no further transactions can be entered for that month. Therefore, any invoices received late from a supplier will have to be entered into the next month and cannot be accurately reflected in the month of purchase.

Where your business is part of a larger organisation and needs to report monthly to, say, a group of Shareholders, then this is probably a good way to go. However, if you are a small organisation, a system that allows you to keep each month open may be better. Many small suppliers do not have the resources to send out their invoices and statements exactly on time and it may help your business to be able to enter the information for that supplier two months down the track.

Year End

At Year End you can again produce a number of reports, which will assist in statutory reporting (for instance, tax) —

- a Trial Balance,
- a Balance Sheet,
- an Income Statement (showing profit or loss for the year just

ended),

- an aged creditors list (that is, a list of all your suppliers with the amounts you owe them and when the amounts are or were due for payment),
- an aged debtors list (that is, a list of all your customers with the amounts they owe you and when the amounts are or were due for payment),
- a complete stock transaction list, showing quantities and values on hand,
- many other reports to suit you, as most systems will allow you to create your own reports.

Year End Closing — The system we used allowed us to keep the year open for several months (six) without affecting the next year's transactions. This meant that our accountants could do their audit and make any changes that might be required for tax purposes.

The Owner relates his experiences over lunch

The owner's conversation during lunch — the subjects are in the sequence in which they were brought up. Orderliness is of secondary importance to realism. This is how the conversation progressed. There is no structure, because that's how informal conversations develop. Some are the answers to questions you might have brought up. The rest are anecdotes.

“Yes, the prawns were very nice, thank you. I'll have the steak next, with a bottle of Valpolicella.”

The first encounter with a Mark 2 Jaguar

My first experience with the Mark 2 was somewhat painful and I only have myself to blame. The embarrassment has worn off over the years, but it still hurts the ego to relate this tale.

In 1967 I was the proud owner of a Vespa scooter. With a full 125cc of two stroke inefficiency, I could cruise easily at 40 miles per hour. Those were the days of “Mods” and “Rockers”. I could never work out which was which. I owned a scooter purely for financial reasons. I couldn't afford a car! There was no reason to become gregarious and swarm around in groups getting up to all sorts of nonsense during the summer holiday season, so I kept pretty much to myself. If a Triumph or a BSA motorcycle surfaced as far as a mile away, I'd turn tail and divert down a country lane before they even got a whiff of my two stroke mixture.

One of my colleagues at work was ex-Royal Air Force, complete with a full handlebar moustache. For some inexplicable reason this

had secured him a job in our Organisation and Methods section. The moustache made him a shade eccentric and he had perfected a pseudo upper class accent, which let him down badly after a couple of pints of heavy beer. For the detectives amongst you, the term “heavy beer” may allow you to deduce this story starts off in Scotland.

The staff generally gave him a wide berth, not because there was anything wrong with him, rather because we couldn't find anything wrong with him. We all had our faults, and we felt more secure with people of a similar disposition. We found out where his mother lived, which brought his image back down to earth, from our perspective. He continued to stroke his moustache and talk about the joys of fox-hunting. We were confident the nearest he had ever come to a dead fox was when he was scrounging around the second hand shops in Edinburgh.

It was our considered opinion he had spent all his savings on an almost new Mark 2 Jaguar, just to enhance his image. Of course, this included going the full hog and buying the 3.8 with the manual gearbox. Sedate driving was the order of the day and he certainly drove slowly and carefully. I made the mistake of suggesting this was because, at our salary levels, he couldn't afford to fill the tank with petrol. Unfortunately for yours truly, he overheard my unwise comments. Not a word was said — at that moment in time! There were quiet whispers in various corners, but none of this was of concern to me.

A few days later I found myself, surprisingly, with a small project at the company's other factory. It was not really in my field but junior staff don't quibble with the boss. Our ex-RAF colleague was also involved, which should immediately have made me smell a rat. He hardly knew one end of a production line from another. In fact, I doubt if he even knew where it was. There was obviously no need for us to travel separately and in the comfort stakes a Mark 2 beats

a Vespa any day. The rain also appeared, as if on cue. So Biggles and I departed in Coventry's 3.8 litres of pride and joy.

I should have been further alarmed because my ultimate superior and some of the senior engineers in the office were already at the other factory, awaiting my arrival. It was unusual to have such an amount of brainpower in one location. But hindsight is a wonderful thing. What was to be a gentle meander, where I could most probably have ridden there faster on my Vespa, turned into a nightmare.

Our former aviator chose an alternative route around the narrow lanes and hedgerows. It was the type of road where there was just enough room for two bicycles to pass each other. Instead of his usual boring 30 miles per hour he took corners at 70, and straights at over 100! That's 160 km per hour, for those metrically indoctrinated at an early age.

I almost died of fright. I was absolutely petrified. For the first time in my life I experienced the heavy "G" force. A hand worked the gear lever incessantly. The engine roared, dropped off and roared again.

My stomach was complaining in very serious terms. I cried out, but to no avail. Hedgerows jumped out into our path, only to jump back again at the very last minute. Then the window wound down. The right arm left the steering wheel, nonchalantly resting on the window. Two handed was frightening. One handed was suicidal. The smile on Biggles' face stretched from ear to ear!

I yelled out he was going to kill us and he just laughed. Well, not quite! He just laughed and put his foot further to the floor. Biggles started to explain, with all the patience in the world, that you didn't have to see the road ahead as long as you could see between the trees when you corner. Apoplexy descended upon this green faced passenger.

I still feel sick just talking about it! Forty years later I still succumb to travel sickness when I'm a passenger in a fast car. The journey was interminable or, to be more precise, let's say around twelve minutes. That's a long time when you know your physical side is about to be restructured around a tree.

I began to wonder if my wife would take good care of my Buddy Holly record collection after I'd gone. My mental side was already prepared for its untimely exit. I just hoped Saint Peter was in a really good, forgiving mood on that day; assuming, of course, I went up instead of down. Perhaps the Celestial golf course was putting well and he'd cut his handicap to a record low.

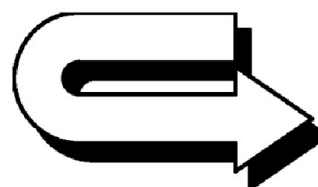
We reached the other factory in an absolutely disgustingly small amount of time. I was really unwell, just managing to keep things under control until we stopped. Then I had to let go in the bushes. Apparently, I was a very attractive shade of lime green. Biggles floated out of the car and wandered slowly off to join the rest of the team. By total coincidence, this mass of brainpower just happened to be standing around in the car park, counting the number of cars with sick passengers.

After regaining my breath, I wobbled over, legs like jelly. My ultimate superior and our esteemed engineering colleagues, wearing appropriate smirks and smiles, naturally said "*Good Morning*", adding "*How are you today?*". When I noticed some of them had two heads and four arms, I decided I'd better sit down. In all fairness, once I had calmed myself and the welcoming party had dissipated, Biggles returned and apologised emphatically.

Yes, he had been asked to do it, but perhaps he had been carried away. It wasn't often he was able to open up the 'Beast'. My colleagues were now quite embarrassed and Mother Superior was worried about holding onto his job.

Then Biggles opened up. The reason for the sedate driving was that he had been a driving instructor in the Royal Air Force. He drove the way he had driven “the top brass”. Of course, he also had skills in defensive driving, evading pursuit and a whole host of other things. Then he explained how the Mark 2 allowed him to drive to the limit without endangering anyone. He showed me the 'all round disc brakes', the monocoque construction, and explained how the power was developed and how the shape of the car was aerodynamic.

I wasn't too sure about the technicalities, but he sounded happy with the car. Changing a spark plug on a Vespa hardly qualified me in this field. For my part, I was prepared to concede and appreciate that he was in control when he drove, and the car was the secret to this. I did, however, find an excuse to stay on after he was ready to make the return journey. Nothing on this earth was ever going to get me back in that car with that particular driver. I was quite happy to stand in the rain and take a bus back to the other factory!



Quality

The quality of the product was very poor in the early stages of the operation. This was due to the original owner having no experience of production systems. He was someone who enjoyed playing with cars, pulling them apart and fixing them. He built up quite a lot of expertise in this. He was also impossible to work with, a common trait among people who take an idea and run with it. There was no aspect of the business where he did not know better and attempt to influence the work of other, much more capable people.

It was a motivational nightmare, because employees were continually under the impression that their work was not good enough. After a few weeks they either left or succumbed to the pressure and did what they knew was wrong.

I have a totally different way of doing things. In this, I am always the one who knows nothing about the operation, nothing about the skills needed, and cannot assist the employees. So they show me how much skill they have, how clever they are, and I agree with them. I make no efforts to instruct them. But I do, by continuous exposure, make them aware of the needs of the customer. I encourage them to tell me what we need to do in order to achieve these quality needs. And they are happy to do so.

As an industrial engineer, I am well versed in what people can achieve in a day's work and I can analyse any situation according to established principles. So it is not an easy matter to fool me. By emphasising the customer's needs from many different directions, the employees would solve the problems in the order I decided. As far as they were concerned, I had no input whatsoever!

Our business objective was easily defined. We wanted to produce the best quality product of its kind in the world and make a profit in doing so. You don't have to do much to get people on your side with such an objective, especially when the staff have their pictures in international motoring magazines, appear on national television and in the newspapers, where all their friends can see their achievements. Of course, they must feel they have the total and absolute respect and confidence of management. That doesn't mean you don't have the odd row on the production floor but, underneath, they always know you still respect their abilities.

In my view, and at first glance this may appear contentious, there is no need for a structured quality programme in many businesses. Producing the agreed quality levels is just a part of any manager's job. It is only when the managers don't have the correct environment or the necessary abilities that a structured approach is needed.

The difficulty nowadays is that management can't allow employees to make major quality decisions, because there is no guarantee that management and the employees are even on the same side. You just have to listen to the rhetoric from some sectors of the union movement to realise their objective is to divide rather than reconcile. Then again, I always find it strange how attitudes change when the same senior union officials retire and move on to the boardroom or the political arena. It's a game that costs industry a great deal of money.

So, the very first stage in any quality campaign is to get everyone working on the same side. There must be an objective with which everyone can identify, which everyone can participate in achieving, and in which their status in the community will be increased. They have to be proud of what they are doing, and their employers must make sure they broadcast the achievements far and wide.

We had an employee who appeared on a national television programme. Some school-kids recognised him the following day and asked for his autograph. He floated on air for weeks. We almost had to scrape him off the ceiling!

In this day and age, where union attitudes can be a problem and where the threat of being sued for minuscule breaches of regulations is always lurking around the corner, many managers may feel a totally rigid, authoritarian regime is the best. But you trade many benefits off against this need for security. Innovation is the first casualty.

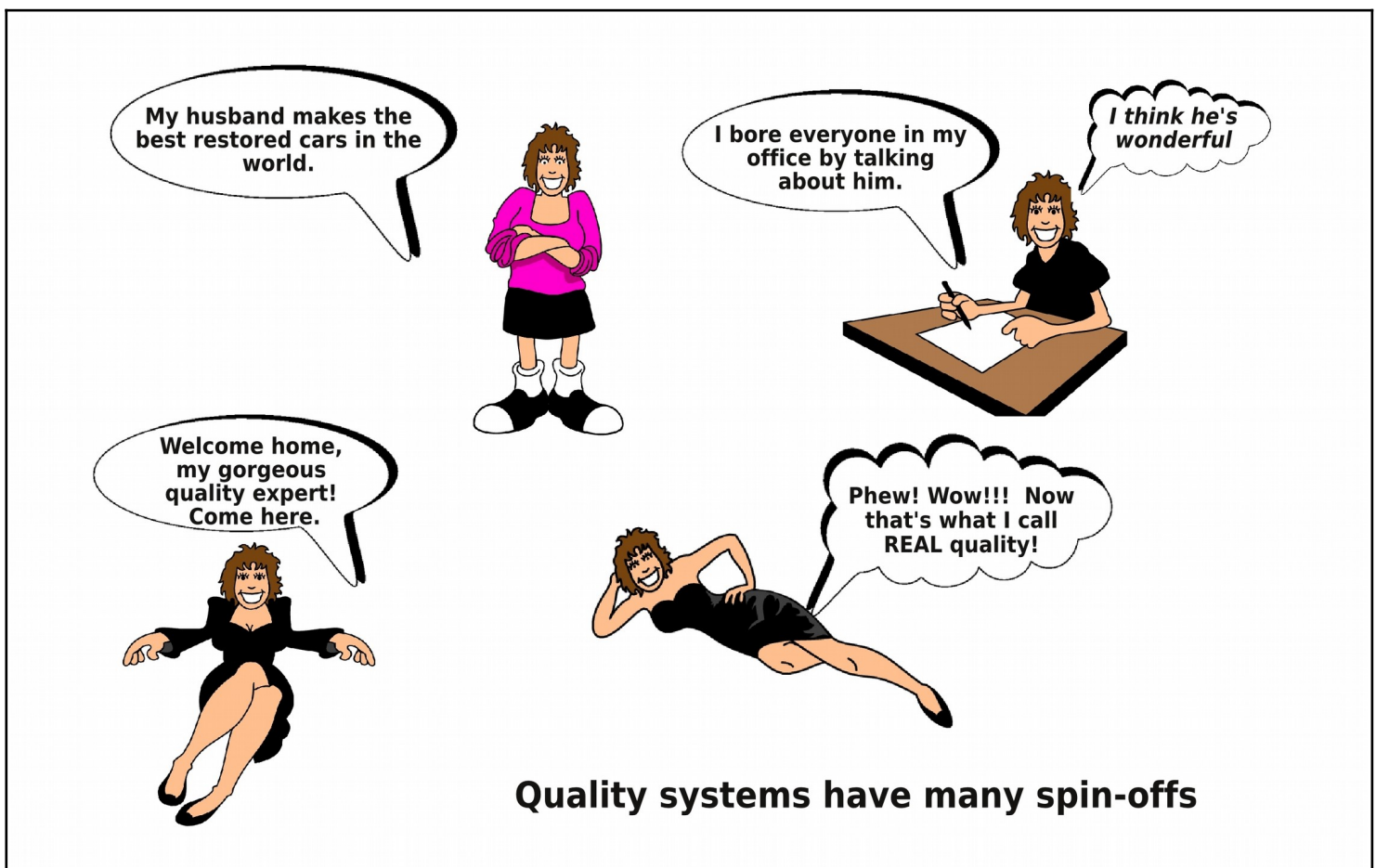
Motivating people, even under these circumstances, is still not too difficult. But you must have people who fully understand the objective. It's a one-to-one thing on the shop floor, where people work together and respect each other's abilities. Glossy magazines or company newspapers, telling the staff about management success, with lip service to the employees (the obligatory photo of presentations for long service etc.) does very little.

With unions you either stand up to them and kick them out of the organisation, or work with them for the well being of everyone. But never pussy foot around somewhere in the middle. That is just demotivation for everyone. Union officials have egos just like everyone else! They can be encouraged to work with the business, providing they get the same status benefits as everyone else.

Management may have had to develop 'special arrangements' with the powerful unions and their officials, but that is something for them and them alone. At the front end, on the shop floor, the problem is much more localised and, regardless of what transpires at a higher level, the need for co-operation and respect still applies. Without it, quality will either suffer or be very expensive!

As you will have gathered, we did not use ISO 9000 quality standards, or any such equivalent. Instead, the cost of administering such programmes could be, and was, utilised in staff motivational programmes, such as buying a few cases of beer every few weeks, stopping work an hour early and consuming the said articles whilst discussing every subject imaginable!

“The food is quite good here at the moment. They had a bad spell last year when the chef walked out. This fellow was poached from somewhere down the coast!”



Systems

Jobbing operations are difficult to control, so I decided to make the operation comply with the same form as major car building operations. I once worked in a plant which assembled Nissan vehicles and I understood how they scheduled the parts onto the assembly line. With the critical cash flow problems the restoration business was experiencing, *Just in Time* was not only advisable — it was necessary for survival.

I had a clear concept in mind, which required total control over the management systems. Everything would be designed and implemented by my wife and me. Our initial objectives were clear. We needed to set out how the products were manufactured, set up parts lists, subassembly lists, etc. Every part had to be available or the accurate status known at all times. Classic car restorers are notorious for late deliveries. In fact an 'on time' local delivery is somewhat of a rarity.

We were exporting halfway round the world, to the most quality conscious car markets in the world. We had to be able to live up to our delivery promises. That's why we needed the computer systems. Over a period of five years we were only late on one delivery, by one day, and that is because the ship carrying the car had mechanical problems. We shipped on time, every time!

The secret is not really a secret. It is just plain common sense. All I had to do was set things up so that the parts were always available at the right time. The staff took it from there.

My thinking is not quite so simplistic as Henry Ford's famous quote, but we both knew nothing would happen unless management had their act in order.

I don't believe in reinventing the wheel, so we looked at a whole range of computer accounting packages. Initially we used a local programme, but soon found out it was not suitable for our purpose. So then we bought DacEasy, an integrated accounting programme from the USA. This was just a dream come true! It did everything and a lot more.

In a very short period of time, my wife, who was not a trained accountant, was setting up charts of accounts, bills of material, stock lists etc. Not long afterwards full accounting information was pouring out, much to the pleasure of our accountant and our bank! You will be able to see the magnitude of this task when you go through the paperwork systems. And all of this was achieved by simply reading the book which came with the software and, perhaps, a little natural intelligence.

At the risk of seeming too effervescent, or trying to curry favour with DacEasy, we could not have done it without their system. And the best thing — it cost us \$115 (US). That's correct, one hundred and fifteen US Dollars! Now, just pick up the phone and ask a supplier of computer systems for a quote to put something together for you. You'd have to add another couple of zero's just to get them interested, and perhaps three zeros before you had the system up and running!

Of course, with the open source software available now, you can find and use a similar package for free!

“Lovely, thank you, but I think we'll wait a few minutes before you bring the next course. I'll give you a wave.”

Bank Finance or Financial Freedom

“Take a look at that table over in the corner. That’s one of our local bank managers and he’s obviously being wined and dined by a cash-strapped businessman hoping for a sizeable loan. Let me tell you something about the banks in this country, although of course I accept this may not apply in other countries.”

One of the major problems for all businesses is getting the finance right. Borrowing money from a bank is a dangerous thing to do. Not only will they know all about your business (and, in this day and age, how much value can you put on assurances of confidentiality?), but they will also require you to offer your personal assets as security.

Don’t ever forget that banks see you as a way of generating profits for them. That is the criterion for lending money. In effect, you almost work for the bank, because you are having to pay some of your profits to them in interest payments. Remember, in spite of assurances to the contrary, loans are made on the basis of how they will benefit the bank. Providing the bank has enough easily realisable assets that they can take, they will lend under conditions which may not be in your interest.

We were aware of a business which had substantial loans from a bank. Interest rates were high at the time and they were paying 16% on their loans. If they were late in meeting payments, this went up to 22%. In effect, all of their profits, and some more, were being paid to the bank. They would have been better folding the business and working in their respective trades for another

employer! Naturally, the bank was anxious to keep the business going and made no attempts to give them advice when they desperately needed it.

As a further point bear in mind that, if you should go under, some banks have departments that will liquidate you right down to the shirt on your back. They pay their staff a bonus on how much they can extract from you. I don't know how widespread this is, but it is better to err on the side of caution and assume it is possible that it could happen to you. So just think of an immature twenty-five year old bank employee with expensive habits, a sports car to support, and all sorts of other monthly costs. You may be a pillar of society, with a fine family and an honest reputation, and have never done anything wrong in your life. But the kid will send you to the wall. He needs the money!

Not all banks are the same but, before you get involved with them, take a look at the profits they are generating then work out if this supports the caring, benevolent attitude of their advertising. Find a bank that may have a real interest in working with you, such as one which operates mainly in your locality, and which wants to develop the local business community. The big national chains have too many other priorities!

If you should have problems with a bank, remember, they have dark secrets hidden away that they don't want anyone to know about. This is especially true if they have offshore branches in tax havens. The last thing they want is you bringing up this fact and producing evidence to demonstrate how they assist people in evading their lawful taxes. So, never be afraid of a bank.

In all probability, they were wrong in lending you the money and they may have been instrumental in doing things which caused the business to fail. Their loan documents are typically grossly unfair and one sided and incapable of standing up in court, providing you

go about it the right way. So take them on, in a full frontal attack, and you'll probably hear nothing from them again!

“Take that fellow over in the corner with the bank manager! I know him, Fred Smith, and he’s your typical small business man in this area.”

This may seem an improbable way of doing things, given the incessant publicity from the banks, but I’m sure he would find this works. Fred can raise working capital by not spending money. To do this he needs to have a commitment and a desire to succeed. He must be prepared to make short term sacrifices in order to achieve his long term aims.

Think of it this way. His business is his life. It is his employment, his hobby, and it takes up most of his time. So he needs to accept the fact, immerse himself in the thing, and become a hermit for a year or two. During that time, he should spend only what he needs to survive and plough everything back into the business. He should get some books that will help him to understand efficiency in all its forms and he needs to set up a system to analyse absolutely everything in the business according to these principles. As an industrial engineer I can tell you that, in any business which has just developed according to the expansion of sales, the possibility of a 20% reduction in costs is not unusual.

Fred needs to get his ordering and payments set up so that he has the completed goods delivered to the customer before he has to pay the supplier for the raw materials or, if the time frame is lengthy, to cut it to the absolute minimum. His invoicing needs to be slick and on time. If he thinks he can get away with it, he should ask for payment on delivery, or inflate the price and give a discount for payment within seven days.

Fred must never be a source of funding for his customers by agreeing to delay payments or providing credit. He should buy in quantities that are the most efficient, but never to the extent that they can cause cash flow problems. When the mail arrives, he should throw all brochures from the banks in the rubbish bin without reading them. They can be very seductive!

Fred needs to fine tune his costings and sales prices to maximise profitability. Then he should get his accountant to set things up so that he makes the absolute minimum tax and social security payments during this period. The idea is not to evade his tax responsibilities, just legally delay the payments so that he can use the funds to expand the business. His thoughts should be to reduce costs, delay making payments, get customers to pay immediately, and invest everything back in the business. Above all, he mustn't be brainwashed by convention and must never do things just because that is how everyone else does them.

After a couple of years Fred will be in a much better financial position than if he had taken money from the bank and, more important, his organisation will be leaner and much more competitive than the opposition and he'll be in a position to keep it that way. From then on he can't fail to succeed.

THE PARACHUTE BANKING CORPORATION



The government keeps offering us billions to make sure we don't go bankrupt, and we want to share it with you. Bring in your own money and we'll give you the same back again, plus another 10%, and it's all freshly printed in our own presses down in the basement. Call in before noon and get another 10% absolutely free. And there's more! Call in before 10 am and you will get an unbelievable "double your money". This offer closes at 5.00pm today. In the event that the 9.00 pm flight to our tax haven is cancelled, the offer will remain open until 5.00 pm tomorrow.

Please wait a few days and allow the banknotes to achieve their full maturity before using them for transactions.

PARACHUTE - WE'LL BRING YOU DOWN.

Motivational Issues

Sometimes taking a stance on a popular view can open the doors. Mechanics and restorers definitely like pictures of naked women, of that I am certain. At the basic entry level this is confined to putting up calendars from trade suppliers. These are usually harmless things which display two, usually rather large, mammary glands, with an attractive lady in tow. I haven't heard stories of the photo sessions being held at gunpoint so I have always assumed the ladies were perfectly happy to show off their attributes and take the money.

Allowing the staff to display these calendars has a beneficial effect. Mainly it provides a statement of their independence. They choose to display them and management supports them. Of course, it may seem offensive to some feminists and I think this is another reason for the display. It's man exercising his dominance.

Whenever we had ladies touring the factory, we always advised them of the position with regard to management's policy. They would see pictures of naked women in the factory and these were not considered offensive, but they could remain in the office if they wished. No one ever did.

Of course, things have now gone to ridiculous levels. People watch television with nudity appearing on a regular basis. In Europe there is a daily dose in "The Sun". It is quite possible to take your children to a popular beach, where they can see as many live, free swinging bare breasts as they wish. But industrial legislation may ruin you if you allow one of your staff to have a picture of one hidden away in his locker and it is seen by someone who, for ideological reasons, takes offence!

Boys will be boys and from time to time fairly rude cartoons would surface, photocopied a hundred times so that they were hardly readable. These were examined, the customary crude comments made and then put away. They could keep them in their toolboxes and bring them out when they wanted to, but they could not be on display. It caused no problems.

Once, though, one person went too far and had a fax sent to the office with a very, very crude cartoon enclosed. By sending the fax a criminal act had been committed. I called the local police office and arranged for an officer to call in when he had some spare time. He asked a few embarrassing questions of the staff and then went off. I told the staff they had gone over the agreed line and that I could have charged some of them if I really wanted. They agreed, in fairly sheepish terms. So I said, "OK, it's all forgotten. By chance I have some cold beers in my office, so why not knock off now and we'll demolish them?"

Within half an hour they were back to normal, telling crude, racist and gender related jokes with relish! Not only that, but they had a good armoury of religious jokes as well.

You might enquire *"why did you allow them to tell crude, racist, religious and gender related jokes? Wasn't that offensive?"*

The reason is quite simple. I had the privilege of sitting in the background observing their efforts. They were in a closed environment and I saw no reason to restrict them. On the contrary, I was able to identify the ringleaders and see how much they could influence others.

This was particularly useful with regard to race. If there were any potential problems of a cultural nature, the offence given to some employees would become apparent as the evening progressed. I could then take steps to contain it. Strangely, our staff were fairly relaxed in matters of race and religion, and seemed to find very

little offence in anything their colleagues said. It made running the business much easier!

At one time we employed a Born Again Christian. He began by unilaterally removing all the calendars of naked ladies. I could have cut the staff wages by 20% and had less strife! As the adhesive tape was requisitioned and the calendars restored to their (apparently) rightful place I called in the gentleman concerned.

In the manner of many religious converts he took his ministry quite literally. He was going to cast out the devil regardless of the consequences. I explained the consequences would be that his job record would show he worked with us for only two days before being fired! Some of the veneer fell off. We were able to come to a compromise. I would ask the staff not to make derogatory religious jokes when he was around, and he would accept the majority verdict on what constituted "art" would prevail.

Within a few weeks the words "big tits" had ceased causing him offence. When the new calendars arrived in December he showed an unusual interest in forming his own opinion on how sick and depraved the ladies were (by examination, of course) and how the attributes of one compared with another. Life settled down to co-existence.

I'm not trying to put anyone down on religious grounds — I, myself, am a Presbyterian. I just believe that we live in a real world, with real people, and it is not management's job to try and change their social attitudes.

“Yes, ready now. Ask the chef to keep the pepper down to reasonable levels, please. In fact, I'd prefer to do that bit myself, if that's OK with him.”



**Sometimes we had to
use unconventional
motivational techniques.**

The Restoration Business and its Problems

The business had been operating for some time, although even today I'm still not sure of its history. Suffice to say the original proprietor had an interest in restoring cars and had been doing so on a small scale for many years. Around 1987 he started trying to build it up into a proper business in line with the worldwide demand for classic cars.

Those with an interest in world events will remember that in the late 1980's there was a great deal of money floating around in Japan. They had so much they didn't know what to do with it. Importing classic cars from Europe provided some status and a minuscule effect on the balance of trade surplus. The great stock market collapse added its own dimension to the problem.

Conditions were deemed good enough by one business in Japan to import significant amounts of restored cars from overseas and sell these at very high prices and profit. A deal was struck with the business to sell 56 cars into Japan. When I arrived, deliveries were running at about 50% of requirement and quality was totally unacceptable.

I need to put things in perspective. The owner was not a businessman and had no knowledge of operating in a manufacturing environment. He could not plan or schedule and when production fell far behind requirements he worked longer hours, cut corners and compromised the already poor quality to get cars out the door. It was sad to arrive and find that the product being sent to the most quality conscious market in the world was being thrown together, test driven as little as 500 metres and then put into the shipping container.

It was 'Catch 22'. Quality could not be improved without major changes to the operations and deliveries were so far behind that any form of restraint was impossible.

After one month in the hot seat I concluded the business was insolvent. Too much money had been taken out of the business to allow it to operate. The Japanese had put in large deposits and these had gone. I started looking at the *Situations Vacant* in the local newspaper. There were not many vacancies for people who could make a business insolvent in their first month.

The crunch came when the new factory was to be officially opened. On that day the European gentleman who ran the Japanese operation in Tokyo arrived to take part in the celebrations and see how his money had been spent. He was sitting in my office when the phone rang. Expecting a call himself he picked it up. It was the bank telling us they would close us down that afternoon. I took the call with him sitting alongside. My conversation was limited to monosyllables, lest I let the cat out of the bag. In the end I said I had to call back.

Our Japanese customer asked if I had a problem. I hedged. He pursued. I considered. Then I realised if I said nothing we would be closed down anyway. So I told him the story.

A few hours later we had a meeting with the bank. The Japanese agreed to work with us. I was to take over complete responsibility for the business and the owner was to pull out and take a back seat. We opened the factory with suppliers and customers happily wishing us success, little knowing that we came within a few minutes of being closed down by the bank that same day.

Within an hour we began stripping down the completed cars in the production area. These cars were ready for shipment to Japan and we had to start the build over again. And I mean a complete bare metal strip down!

A month's production was lost, and a very large sum of money, but the strip down and rebuild allowed us to focus on the Japanese complaints and address them to some extent. We developed a strategy and a quality plan for the future.

The staff were given full authority to make improvements without reference to management. I had been thrown in the deep end so I took them with me. After all, I knew nothing about the product so they could hardly be any worse than me. Providing they had a consensus that the improvement was useful, necessary and, if possible, cost effective, they could do it.

Perhaps that is simplifying things. As part of my career in management, I have always had a great interest in motivational techniques. I suppose I was just doing my job, as you would expect a good manager to do. They got immeasurable satisfaction from the trust I placed in them and things just mushroomed from that point on.

We agreed to test the running gear for 1,000km by fitting it into a special test car. In the end the cost of the product increased by nearly 20% but there was no alternative.

We had a further major financial problem a few weeks later and I had to call in the Japanese again. This time a new business was set up with myself as Managing Director. The Japanese took control of the operations and this continued for a further two years until my wife and I bought out the business.

During a period of five years I was responsible for the production of over 100 fully restored and enhanced Mark 2 Jaguars. Although we entered into a business that was in total chaos, with terrible product quality, unbelievable financial problems and poor workforce relations, my wife and I never felt anxious in any way. We knew what needed to be done and that we had the skills to do it.

**We heard you have a financial problem.
My associates can let you have all the
money you want at 50% interest, with
security over the business, your wife
and children. Interested?**



A Sheepish Tale

I decided I should drive the cars in their unrestored state. This would give me an idea of their condition. After all, this was a product of Jaguar and, no matter how old the car was, it had a reputation. On the first car I drove the engine was running well. It burned oil at a ferocious rate, but it was about to be stripped down and rebuilt.

I carefully applied the brakes and they worked. A pull to one side, but that I could live with. The indicators worked and one of the stop lights would illuminate just a shade. About normal! Tattered leather I could understand, as the car was thirty years old. The paintwork had been redone and it didn't look very bad at all.

I put some petrol in the tank and set off for a drive with a can of oil and a few bottles of water, just to be on the safe side. Now, this country is famous for its sheep. There are forty million or so of them. A local farmer told us they had tested the sheep and found out they had an IQ of between two and four, as against the human response of one hundred or so. In our area, where there were plenty of sheep, the normal distribution didn't apply, because I'm convinced that they were all really, really stupid. Still, I don't blame the sheep, they couldn't help it!

From my experience, there appears to be a direct link between the intelligence quotient of a sheep and the flavour of its meat. The dumber it is, the better it tastes. So, providing you are not a vegetarian, you can feel good about cooking one that has done something really stupid, like eating up all the pumpkins you spent days planting, nurturing, watering and singing Mozart duets to make them grow. The duets were between my wife and me, not the sheep and myself. Sheep don't normally perform Mozart very well,

although I've heard a fairly good rendition of *Sarastro's Prayer* by a group of ewes calling their lambs. The proviso is that you don't get carried away with originality and insist on all the notes being in exactly the same places as Mozart put them.

I set off in the 1960 Jaguar Mark 2 with its 3.4 litre engine, accompanied by a blue haze from the exhaust. The car was unregistered and, even though I was using trade plates which made the journey *legal*, I wasn't sure about the insurance position. So I decided to use back roads only and go home for lunch, a journey of about 45 minutes each way. Things went well to start with. The gearbox was a little stiff and there was an almighty crunch each time I changed gear. But we were rolling along.

Oh! the other thing about our sheep is that the *mob* often take over kilometres of road as they move from one pasture to another. And a final thing about sheep is that the size of the mob can easily be around a thousand, meandering aimlessly along these narrow roads.

Now, I can almost anticipate what you're thinking, considering my earlier comments. "*He's going to meet a bunch of sheep and it will centre around killing them and eating them because they were so stupid.*" I wouldn't advise you to put a bet on it.

I was going down a hill when I put my foot on the brake to restrict my undue haste. As I said the car was old. It was not just old, unbeknown to me it had been left out in the rain for several years. The rubber seals had perished in the hot sun and allowed the rain to enter the car. As any physics student will tell you, water and steel combine to produce rust. The amount of rust is directly related to the amount of time the water and steel are in contact with each other. In short, I put my foot firmly on the brake and both the floor and firewall fell out, along with the brake pedal.

Now professional managers never panic; they evaluate the situation from all aspects. Careful evaluation of any situation is a prerequisite for decision making. Having done so, with due regard to their current predicament, they may then decide to jump out of the car. Only when they realise the door handle doesn't work, and they can't get out of the car, do they consider panic as an option. It wasn't such a bad deal. There I was in a car with no brakes, going downhill at around 65km/hr and slowly accelerating.

Earlier I suggested the gearbox was performing at less than its optimum. I'll correct that statement now, using the colloquial. *It was really stuffed!!!* I couldn't change down to use the engine effect for braking. The car continued to accelerate.

"What about the handbrake?", I hear you thinking! *"What about the handbrake?"*

Yes, that would appear to be an admirable suggestion. A hand drops off the steering wheel. Yes, there is one and that's a relief! A gentle pull is all that's required to find out it's not connected to anything. Speed is now slightly higher and the road is still going down. I don't get the chance to fear the worst because it turns off to the left and I've no idea what's around the corner. But you can anticipate what's around the corner, can't you!

I knew that when we restored Mark 2 Jaguars we removed the old steering gear and fitted the model from a later car. I had meant to ask why this was, but I needn't have bothered. I was about to find out myself. At 80 km/hour this particular steering gear was so worn it went into gyrations. The steering wheel was uncontrollable, but I managed to summon all my strength and haul the car around the corner.

About a kilometre further away from me the road suddenly turned white. For as far as the eye could see.

The road was now level and not still descending. I tried crashing the gearbox, but it refused. So I'm now free-wheeling. Fortunately, the speed was slowly reducing. I was back to about 65km/hour with a few hundred metres to go before the start of the white fleece. I began to work out the damage claim against me. I reckoned I would take out around a couple of hundred sheep at about forty dollars each. That's about eight thousand dollars.

I was down to 55 km/hour with about a hundred metres to go and the road started climbing sharply upwards. Now that sounds good. Unfortunately the sheep must have done a crash course in science and had enough sense to realise that the shortest distance between two points in the same plane is a straight line. They were following the low side of the road camber which offered a shorter distance to where they were heading. Not only was I going to take out the sheep, but for the first time I realised I was in very grave danger of being killed myself.

There was a sharp drop on the high side of the road. If I tried to miss the sheep and went high I would leave the road and would not be coming back. Fifty metres, and the speed was down to 45km/hour. The sheep marched on relentlessly, little knowing that within a few hours they would be the main ingredient at the local pet food factory. I saw no reason to obliterate myself, at least not before writing a book of my experiences.

And then a miracle appeared to happen. A whistle sounded and a sheep dog belted out from the side of the road, like the proverbial bat out of hell. Another appeared in a fraction of a second. They ran straight in front of the Mark 2, towards the sheep. Side by side they swayed, at unbelievable speed and in perfect unison. They cut the flock into two distinct sections and drove them onto the verge at each side of the road. Even with the skill they possessed they could not get all the sheep out of the way. But there were no sheep directly in the centre of the road. There were sheep every-

where else, but not there. I knew I would still hit those towards each side of the road. But now the real panic was about to set in. With my legs dangling in free space, what would happen if a sheep was pulled under the car?

The speed was down to around 35 km/hour as I started the ascent. I hit the first sheep a gentle glancing blow a second later. Then one on the other side. Then two together on each side. None of them were hurt. I bumped into more and more sheep, so fast it was all a blur. But none of them seemed hurt. The blows were just glancing. I had not made a direct hit. It was like turbulence on an aircraft. And then to my unbelievable surprise, I was sitting in the car, totally stationary. The fleece had acted as a brake, progressively slowing me down.

I have no recollection of what happened in the few seconds immediately after the event. Somehow I stopped the car from rolling back. As the last of the sheep trotted past they were followed by the dogs and a farmer on a four wheeled motor bike. He just laughed, waved, and disappeared around the corner as if it was an everyday occurrence.

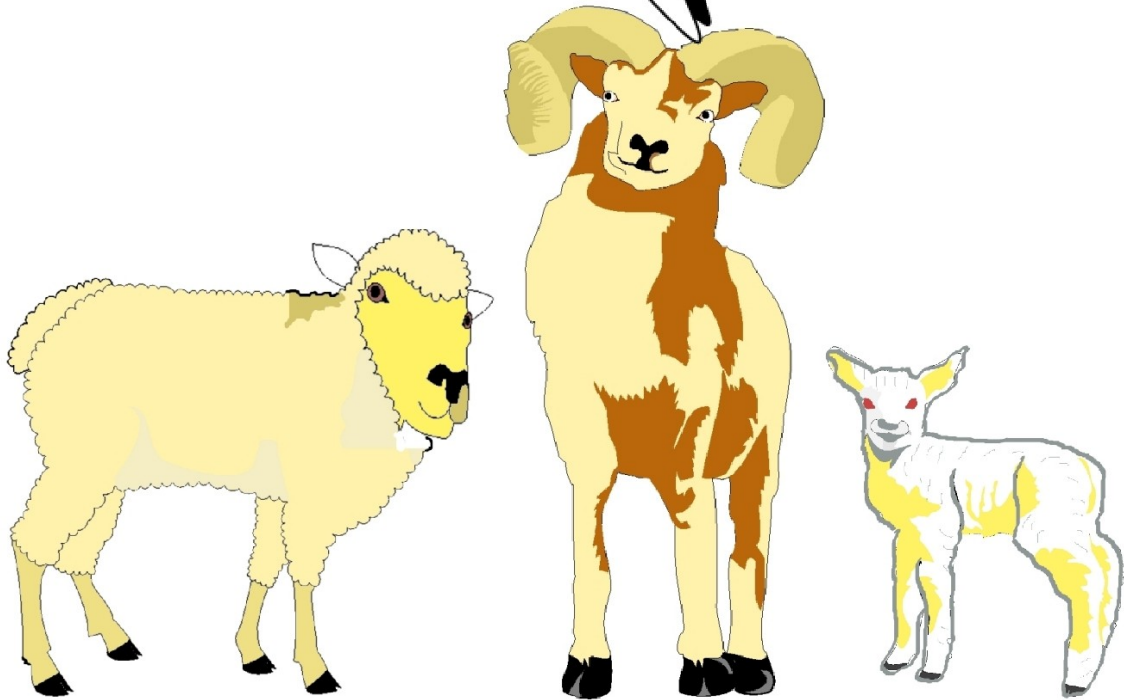
As you might expect, I sat there for a moment or two, or three or four, contemplating events. You can think very religious thoughts at a time like that. Eventually, I connected up the handbrake, wedged the throttle cable in place, forced the car into gear and waddled off home at 10 to 20 km/hr. From there we towed the car back to the factory, stripped it down the same day and it now resides in Japan, hopefully with a better safety performance than I had the misfortune to endure. I had learned a valuable lesson and I did not drive many of our unrestored cars again. In fact, we made sure of this by stripping them down as soon as they arrived at the factory.

As for the sheep well, to the best of my knowledge, none of them were hurt and I certainly did not see any left at the side of the

road or being pulled away. They all managed to get around the corner, and I guess the farmer would have been concerned if his sheep had been hurt and would not have been smiling the way he did. The only good thing about this escapade was that the staff were unaware of what happened. I had nothing to live down and no need to be on the defensive.

I'd really like to find out the IQ of a sheepdog!

**I have an IQ of 4. She
has an IQ of 2. The
little one is down off
the scale!**



**This Rafferty fellow must
have an IQ less than 2. *When
did you last see a sheep
driving a car with no brakes?***



It's not size that counts!

My wife and I were travelling from London Gatwick to Miami on one flight when a couple of gentlemen in their early twenties, obviously on their first flight, had taken rather more than the necessary amount of alcohol to eliminate their concerns about flying. As frequent flyers we usually had seats where we wanted to be, normally by the exits, where there was more leg room.

The two gentlemen were opposite us, looking like bank clerks who had left the tedium for a holiday break. The Bank Manager was probably glad to be rid of them for a couple of weeks. Neat hair, no moustache and clean hands with no scars or embedded dirt, meant they certainly were not manual workers.

This airline did not give free spirits, you had to pay for them. So, unlike other airlines, the bar facilities were not artificially restricted. The airline wanted your money.

To put it simply these two gentlemen were quite 'sozzled'. After a couple of hours, and the usual culinary delights from the airline kitchens, they realised the driver up front was not suicidal and they might just get to America in one piece. So bravado now appeared.

As one of the female stewards passed, one of them slapped a hand on her rump. Training took over and, with a smile, she gently took his hand and placed it on the arm of the seat. She then jabbed her forefinger directly into the muscle of his arm, something which produced pained astonishment. The smile never left her face but she quickly made herself scarce so he couldn't do anything else. Twenty minutes later, he and his companion were becoming slowly obnoxious with their need to show off.

We could see the steward, who was quite attractive, with wavy blond hair and a good figure, hovering in the galley way. She motioned to me, asking if they were occupying themselves. I slowly shook my head. She shrugged. A few moments later a passenger pressed the call button and she took off down the aisle towards the rear of the plane at a speed you would not have thought possible.

Clerk A saw her in the corner of his vision and started grinning, digging Clerk B in the ribs. The two of them were on fire, chuckling and exchanging knowing glances as to their next move. They could not contain themselves and they made sure everyone nearby knew they were going to give her a hard time. And some of their comments were extremely crude to say the least.

The girl came back, to be met with the hand on the rump again. She tried to put it aside, but no sooner had she let go than the hand went straight up her skirt and back onto the rump again. There were a good twenty or thirty people who could see what was going on and we could all sympathise with her predicament. I asked her if she wanted some help. She just shook her head, looking quite calm.

By now Clerk A had his hand around her waist, moving upwards in the direction of her bust. She told him to stop in an entirely conversational tone, as if she was asking how his day had been. Clerk A was now leering and Clerk B was encouraging him to go further.

I asked again if she needed help. *"Do you watch Star Trek?"* was her reply.

I was taken aback. If I was being mauled in full view of the public on an aircraft I would have been more concerned with my position than with last night's TV programmes. I replied in the affirmative.

“Watch this!” she said and turned round to Clerk A. She smiled ever so sweetly and put her hand up to his face. He thought he was seconds away from becoming a member of the ‘six mile high club’. He grinned with pure pleasure.

The girl moved her hand around his neck and then I realised why she had asked about ‘Star Trek’. She gave him the Vulcan paralysing hold, gripping a nerve with thumb and forefinger. He went absolutely still, his face still in the same position, except that the happy grin was replaced by intense pain. She pulled him up from his seat, over into the aisle and dropped him onto the floor. Her only comment was *“Not tonight, Sonny”*.

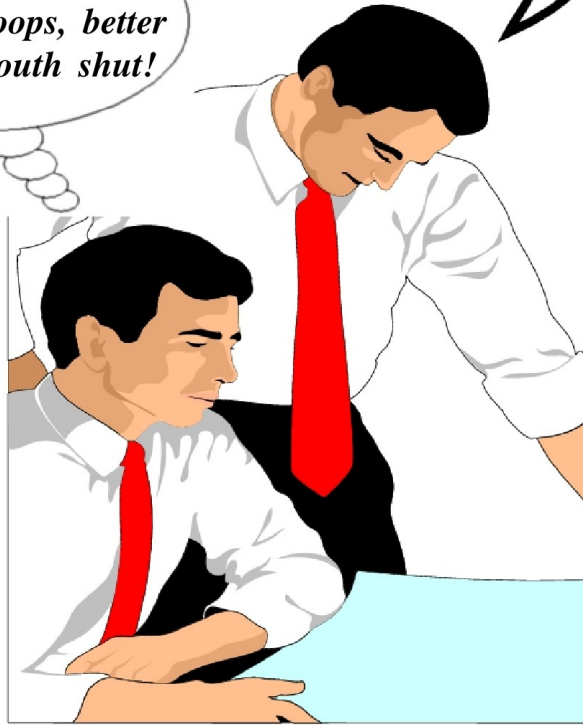
Even in his drunken state Clerk A knew the score. Clerk B pulled him back to his seat and the two of them said not a word for the next four hours. They left the plane in Miami without a glance to anyone.

As they were about to disembark a certain lady in the airline's uniform put her thumb and forefinger together, smiled demurely, and could be heard to say to them “I hope you enjoyed your flight and I look forward to being of service to you in the near future”. They almost ran into the customs hall!

“I’m not so sure I should even look at the dessert trolley. Just hang on until this lot settles. I’ll give you a nod!”

They say she's in Hawaii today, but we take no chances. Let's get on tonight's flight before she has a chance to get back to Miami.

Entirely logical, Mr Spock - whoops, better keep my mouth shut!



Unions

So there we were, all bright eyed and bushy tailed, and raring to show the world what we could do. The word got around *“There's a new boy in town, probably knows nothing about the system over here”*, which was absolutely true. It was like a red rag to a bull.

Within a week I had a letter from the union demanding they be allowed to recruit all our staff into their union. Not only that, the union would immediately require us to negotiate new conditions of employment. That's not a bad thing, you might venture to say. The new conditions turned out to be a return to the bad old days of industrial relations. Everyone was to be entrenched into a system with no flexibility.

Now, I'm all for doing everything I can to help the workforce. I don't believe they have the necessary incentive to work for the benefit of the business unless they have a constructive part to play in its success and a share of the spoils.

The union's position was unrelated to the well-being of our workforce. They were simply interested in trying to attain the maximum number of members before new legislation was introduced which freed up the industrial relations system. Under the old system the unions had a right to compulsory membership and to conduct all bargaining for the employees.

Needless to say, it was the union's position that was given priority in all negotiations, not necessarily that of the employees and certainly not that of the employer. Union organisers genuinely held power and, once gained, it's not something that's given up easily.

The new system was a couple of months away and, in theory, the union still had the right to negotiate on behalf of our workforce. Not only that but they had the right to insist upon all our staff becoming members of the union whether they wished to or not.

My main problem was that I was thought to be an easy target. After years of socialism by previous governments, some of our staff knew of nothing else. They grew up to believe in 'the big hand out' by governments. The State was always there to take care of you no matter how silly you had been. A further problem was that one of the staff had union connections at a high level through his family. He was much better versed in industrial relations matters than I was.

I soon ascertained a connection between a couple of staff members, the local union and the general trade union movement executive. If the business had been successful it would have been another matter. But we were insolvent and technically we should not have been trading under such conditions. Only the promises of support from the Japanese mitigated our position.

I received a letter from the union telling me that they would insist on complete membership by our staff. They demanded a list of all employees, together with various details about their conditions. It was a very threatening and confrontational letter. I mulled over the situation for a few days and then I had a phone call from two union organisers demanding the right to address the staff, as was the law at that time. I said I'd get back to them after discussing the situation with the staff.

Next day, in the mail, a further letter from the union head office arrived telling me that I would be charged, personally, along with the business, with being in contravention of the various sections of the current Act and that action would start immediately. I called the company lawyer, who went through the usual story of having to

write letters to everyone, having to explore the Act in detail, then probably take advice from a legal expert who specialised in industrial relations matters and so on. I could see the profits going quickly down the drain. I decided to sort it out myself.

A quick phone call to Japan was made. I explained the position and said I could see no possibility of making the business work if I had to put up with external interference. Resurrecting the business was an almost impossible task given a free hand, far less with a union playing games to keep its power and profile.

The Japanese would not make decisions, except to say that I had my objectives and they expected me to achieve them. I said I could not do so with union problems. They agreed. I said I would have to take on the union on my own.

They said *"You should never give in to unions"*. I said *"I need some money to offer good conditions to key staff."* They said I had prepared a budget and it was up to me to make it work.

"I'm going to increase labour costs by 15%" was my next comment. *"Good luck"* was the only reply. With that we hung up.

We had some twenty six people in the business, and they were basically all on a similar level because, under the old national labour agreements, there were fixed wage scales. I called in four of the staff and immediately offered them an increase in wages together with full autonomy in the running of their sections. These were panel shop, paint department, mechanical/assembly and trimming. They agreed to take the money, which was the main thing. I was slowly able to create the conditions where they took over the autonomy. But, for my purposes at that time, I had four key players who were not interested in the union coming in and knocking back their income potential.

We held many strategy meetings and I endorsed all of their ideas. This was not difficult because, in general, they knew what they were doing. Within a few days we were all hyped up about where the business was going. The rest of the staff had been involved at a secondary level as well and were feeling that they had a real input into the business. Wherever possible I also tried to give them an increase.

All this took place in a matter of days and I still had the threat of legal action hanging over my head. But now I felt I had some degree of control over the situation.

So I called the union and said *“Yes, I'll accede to your request to meet with the staff, but it has to be done quickly”*. I explained that the business was in very poor shape and I needed to have the meeting to decide if we would continue or not. I even offered to let them go through the books.

I also dropped into the conversation that I had been in contact with the relevant government Minister and he was asking for details of our problems because he could use them as an example of the need for change when he introduced the new industrial legislation.

It came as no great surprise to me that the union organisers were all tied up when we came to setting a date. They suddenly had more important meetings cropping up all the time. I suppose we are all just basic animals at heart and I sensed their fear and my potential victory. So I insisted on the meeting, and we agreed to meet within a few days.

The heavyweight and substantial deputation that had asked for the meeting a few weeks earlier turned out to be no more than one official. He spoke to the staff for twenty minutes and then called for a vote on what they wanted to do.

By a large majority they opted to work directly with management in resolving the problems of the business and their own working conditions. They opted not to join the union or have it represent them. I had another couple of threatening letters from the union over the next few weeks, which I ignored, and they then disappeared from the scene permanently.

It may not sound it but, believe me, it was a harrowing time. Dealing with unions can be difficult and this is compounded when they are fighting for their survival. Union leaders often have real power and they certainly have status among their members. This can lead people to follow them for the wrong reasons. I had no difficulty in working out a strategy for dealing with our particular industrial relations problem. Other people may have taken a different approach and that may also have worked.

I think I was no more than honest in my analysis of the situation and I conveyed this to the union. By setting up the staff in a support role rather than a confrontational role I was able to neutralise the union's position. If the business had to be closed, and I was quite prepared to do so if necessary, then the union were right in the firing line.

In my opinion, and this will be challenged, I think the traditional trade union has one main problem and that is the union hierarchy. Their first priority is to themselves, their salary, status, perks and security.

It's exactly the same in commerce and industry. A chief executive only cares about the shareholder's profits to the extent that by achieving these he retains his salary, status, perks and security. Being successful might even mean being head hunted on the basis of his success and being offered something with even more salary, status, perks and security.

In the industrial relations field I feel it's worth analysing the situation in considerable detail before embarking upon any course of action. The problem may seem easily defined, but the solution that is in your own best interest might only be tenuously linked to the problem.

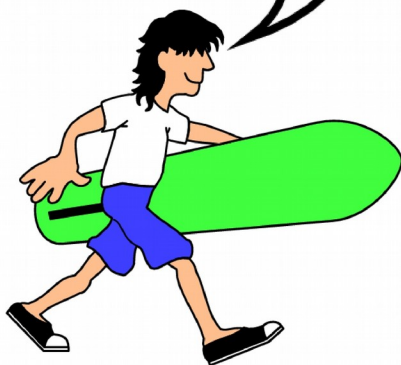
We see Management and Unions in Emergency every month. We write it up as Managementus Unionus Frustrationus Argumentus. We give a placebo and send them home.



Your boss works you 10 hours a day. Want me to whack him? Put him in a concrete jacket?



Thanks, but NO. I work four days, surf for three and get a week's pay. I don't want to change.



Life's no fun anymore!



Employee Relations

Within the business we drew up an agreement that spelled out the necessary basic conditions to which everyone was generally expected to adhere. I use the word 'generally', because we were a pretty strange outfit. By giving certain staff responsibility and authority, and constant feedback on our product's performance overseas, they voluntarily, and without being paid, worked many hours in excess of those set down. It was as far removed from a disciplined and regimented industrial relations system as you can imagine.

The first thing of note about our business is that staff did not work a traditional five day week. We worked four days, with ten hour shifts. As a manager the thought horrified me. I had been trained to believe performance levels tailed off during the day, and the more hours worked the lower the performance level dropped. And that is normally true. It is also a fact that Fridays are traditionally renowned for lower staff morale as the employees await the weekend leisure break.

Does the same happen on a Thursday if you knock Friday off the working week? Our experience was definitely NO!

Many of our staff worked on a Friday, but for themselves, repairing cars by utilising their own particular skills. As a business we did not discourage this, even allowing them to borrow tools or use our facilities. It gave them the opportunity to increase their standard of living without the business having to pay for it. We concluded that, since Thursday was not the end of the working week for these people, it was not necessary for them to tail off into leisure time.

Working hours were 7.30am until 6.00pm, with two 15 minute tea breaks and a thirty minute lunch break. For those people who may find these hours excessive, I can only say that they were requested and were fully supported by the staff themselves over a five year period. Efforts to change them met with stern opposition.

I don't believe we ever lost more than a percent or two in daily efficiency and this was made up over the whole week when comparison is made with the traditional five days. Because the staff were able to schedule their own work they tended to do less arduous things towards the end of the day. This counteracted the effect of fatigue and, as a result, the overall work output hardly suffered.

Within our workforce we had a normal distribution pattern of good, average and poor. At the furthest extremes we had one or two who were quite brilliant and one or two who were simply awful. Even although we had excellent motivation and dedication from most of our staff, and a good easy going relationship, there were some people whose only skill was in fermenting trouble and who could do this with ease.

It's quite soul destroying to do everything you can to develop your labour force only to find one or two individuals are doing everything possible to stop you succeeding. It is more so when the individuals are members of an employee's family and not directly within the business. Then your options are very limited.

The good guys are no trouble. You have to accept that, by developing them as people, you will eventually lose them. They become too good and need more challenges than you can offer them. It's part of the business cycle and each of us has to put effort into training people who will never fully pay back this effort. They will be better performers whilst working for you, so the time and effort is not lost, but neither is it maximised. We each, in turn, have

subsequently taken on someone who was trained by another business, and the cycle continues.

The bad guys are just plain bad news. They often have only a distorted idea of what goes on in business and no understanding of what management has to do to keep a business operating. The common belief is that the managers and directors make heaps of money at the expense of the workforce.

Like most small business people, I earned considerably less than most of my staff. And they could go home and sleep at night, not sit up going over the books wondering how to pay the wages next week.

But management ripping off the workers is firmly entrenched in their minds and no amount of gentle coaching will change it. The disease feeds upon itself and every action of management, whether good or bad, is taken as further confirmation of their belief.

The objective is then to turn everyone against management. It doesn't matter if the other staff are perfectly happy, they must be indoctrinated for their own good. It's fairly easy to spot this type of person at work. Just watch groups of staff from a distance. When you see their smiles disappear you know he's at it again.

I cannot stress enough to anyone in a small business, or who is contemplating setting one up, how much harm one individual can do. Don't be fooled. These people make up for their lack of ability with sheer determination. They never give up. So what do you do?

The treatment of the disease can be complex. Much depends upon the local regulations around which you must work. In some countries the laws are structured to make it almost impossible to fire an employee without having to pay outrageous compensation. If you are lucky they will become such a nuisance that your own staff may take the necessary action themselves. They may find

themselves without friends and eventually go off elsewhere. Beware, though, they might still sue you for allowing this to happen!

In my experience, in a small business there is little to be achieved in trying to work through the normal channels such as giving a series of written warnings to the employee. The problems just linger on, causing you all sorts of difficulties. When the crunch comes and you end up in court, either they will find some technicality to protect their position, or someone will suddenly find their memory is not as good as it was a few months ago and can no longer confirm the misdemeanour.

I never gave any warnings, either written or verbal, because I saw no point in doing so. You either put up with the problem, neutralise it, or you take action and solve it.

Putting up with the problem is an option that is not about to be considered. If you can afford to put up with it then it's not a problem that should take up your time and effort. Neutralising the problem has some merit, especially if the person is of value to the business but is the product of a warped social environment. I had to accept this on occasions, but the end result was worthwhile.

In the first attack we created the circumstances where one particular department opted for a change in their work breaks. This was at their own request, although perhaps management was instrumental in the circumstances that caused it, to a very minor extent. However, no one lost out and management agreed to the change. This meant there was no opportunity for unpleasant comments between one group and the other during their rest breaks. Then we gently and subtly rearranged the places of work so that the small group were on their own for almost all of the time.

It was, in effect, a quarantine situation. No one complained because we had not tried to stop the free movement of people

around the factory. It just didn't happen very much. Then I, or my senior staff, made a point of stopping off and chatting with each member of the group once a day.

The good guys reacted well and the bad guy was the odd one out. He still groaned as always, but I was on top of the situation, neutralising his every move as best I could. Not a perfect solution but I had his skills for four years without too much trouble.

Some people who are troublemakers really stand out from the crowd. They may fool you at the interview but, once they are in the factory, it does not take long before they come to your attention. They generally want to do things their own way regardless of what the procedures say.

That's not a bad thing providing they are right about what needs to be done. If they can improve things then an 'odd ball' can be stimulating for a business. They are only effective for a limited time, but during this time they can save you a lot of money. They usually move on of their own accord.

The problem is when you have someone who wants to do things differently, not because their way is better but just because it is what they, themselves, want to do. It's only a matter of weeks before friction builds up. And usually not just with management. Often their colleagues bear the brunt of things. You can generally be sure if you try to fire them you will have major industrial relations problems on your hands. My view is that in those cases the person is consciously or subconsciously looking for trouble and will eventually find it.

In our case, the particular individual would not allow anyone, regardless of who it was, to touch his tools. I must stress this just happened, and was not some Machiavellian scheme hatched by myself. Picking up and using his tools was just unacceptable to him.

By coincidence we were loading a car into a shipping container and we had a major problem. The ship was leaving in a few hours and the first tool available was picked up and used to rectify the matter. It happened to belong to the troublesome employee. He grabbed for it and the packer who was using the tool refused to let go, explaining that it was necessary or we would miss the ship.

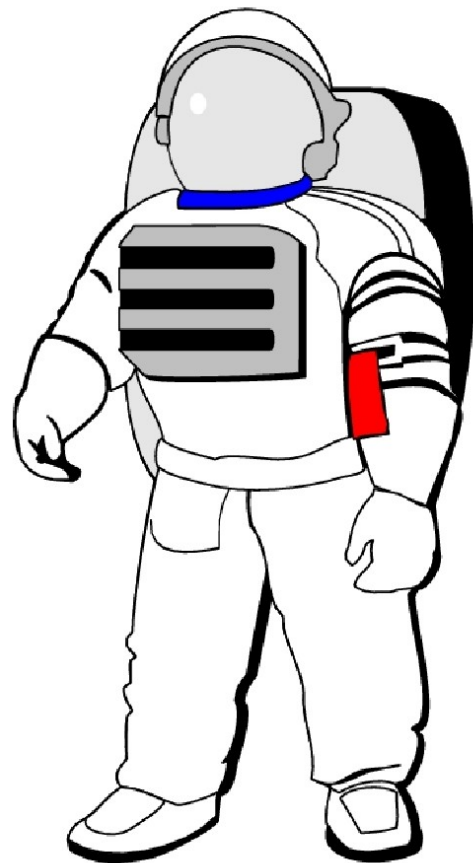
Shipping on time meant payment on time and money for the wages each week. Their jobs were on the line if the container didn't make the ship on time! The person then attempted to wrestle the tool from the packer, who would not let go.

Unfortunately, the troublesome employee, absolutely determined to retrieve his tool, started wrestling and punching the packer! This type of conduct meant instant dismissal with little hope of any help from the industrial relations system. He agreed to resign with a month's wages and no stain on his record.

In general, however, we had very few problems with our staff. During our five year period of operations we were plagued by cash flow problems and this meant they had to put up with a great deal of inconvenience. It is a tribute to their tenacity and goodwill that we did not have industrial relations problems. We were all under stress at times and tempers flared, but we were able to put it behind us and get on with the job.

“There's just about room for some of those Profiteroles, if you don't mind. Half a dozen should be about right. Bring us some coffee at the same time, please.”

**My client feels he has to
provide his own protective
clothing due to the amount of
dust blowing into the factory
from the highway. Let's talk of
compensation around \$1 million.**



A business visit

I decided to go to the 'Top Gear' classic car show at the National Exhibition Centre in Birmingham, England. Our local importer had a car on display and I wanted to get a feel of what went on and what people wanted from our product.

I was stupid enough to believe that the people who go to car shows actually are potential customers for an expensive car such as ours. I quickly found out that the people who go to the car shows do so for enjoyment, education, socialising, and admiration of the skills of the people producing the products. The last thing they go for is to buy a car. If you have the money to buy such a car you call the salesman and tell him to bring it around to your home or office.

The area is so large that you have to park your car in one of the designated car parks. You pay a fee for the privilege and then climb aboard a 'free' bus which takes you to the exhibition hall of your choice. In some cases you can walk to the hall via a series of ambiguous signs.

One of the joys of going to a specialist event such as an exhibition at the NEC is to meet the many unassuming people who are masters of their trade, or have made a unique invention and produced a very special product, and who have no need to make a fuss about it. They sit there at a small stand, happy to demonstrate their product, and talk for hours on a subject which clearly gives them much pleasure. It is infectious and I always leave them with nothing but envy.

Such people may not make a fortune, and I think that's the last thing on their mind. But they help people with a product or just with some advice and everyone feels better for it. As the years go by

they are becoming rarer, replaced by younger people for whom free advice is wasted time and for whom money is everything.

So, whether it's classic cars or making wooden furniture or whatever else, seek these people out and draw off some of their integrity, humanity and humility for yourself. If you don't do it now you may never have the chance.

I spent some time on the stand, watching the spectators as they passed. I'd say 99% of those who came over to look could see that this was a quality piece of work and treated the product accordingly. They'd look from a distance, preferring to stand back rather than risk the wrath of the salesman. In fact, we were all very happy for anyone to get close because the purpose was to disseminate information about the product.

Never underestimate the word of mouth route to car sales. The only question asked, and that was by almost everyone, was "*How much does it cost?*" When I gave the price and the reply was to the effect that he would buy it if he won the lottery, I would restore his dignity by telling him we only sold them in '*his and her*' pairs and we had temporarily run out of '*hers*'.

We've all met the '*self proclaimed expert*'. That's the fraction of a percent who desperately want to be on the local committee, to organise things, to declare themselves experts in everything they come across, from brain surgery to obscure Mongolian dialects. Needless to say, you come across one or two at a classic car show.

This particular gentleman saw the car from a distance, recognised it as something special and decided we could do with his advice and support. I saw him making the 'bee line' and began to think of other places I should be. As he approached I took note of his appearance. He had absolutely blemish free skin. 'Smooth as a baby's bottom' took on new meaning. His clothes were

immaculate, tailored to the millimetre, and fastidiously presented. Blazer? Of course!

His companion was no less well presented, although only a shadow of the man himself. *"They make a handsome couple"* was my first thought.

"1963 Model?", he asked immediately. I replied that it might be, as I was wary of any sort of commitment which might be challenged. *"Had one myself. Wonderful car."* He started to peer around inside. His companion stood back and I had the feeling it was the way things were with the two of them. One set the pace and the rules and the other was just permanently embarrassed.

They spent a few minutes examining the interior trim and then pointed to the bonnet. I was expected to open it, which I happily did. Number one then explained to number two what was under the bonnet. He obviously had seen a Mark 2 before, I think. Referring to the alternator as the dynamo was only the first of a long line of faux pas.

He failed to recognise any of the modifications and insisted on giving me tips on how to make the car better. *"Always fit a bigger battery. Use Duckham's oil. Run without antifreeze in Summer."* The list went on and on. To each I replied respectfully that I would pass these on to my 'technical people'.

If you have met similar enthusiasts, you will already know what has to follow. It is necessary to relate the complete experiences of driving a Mark 2, with anecdotes which are totally unrelated to the car. Hearing that he had driven from somewhere in the Home Counties to Brighton for a day at the seaside was only of interest to me in relation to the ambient temperature and the degree of overheating, if any. To him it was reliving the whole day. I tried desperately to steer him away from the stand but he stood his ground.

An hour later I was still making benign nods and agreements to every comment. His companion had not uttered more than a sentence in all this time. I had given up thinking number one was anything except a real pain in the backside!

As my patience neared its end I thought *"if he teaches me all that he knows then I'll still know nothing."* He could see my business depended upon his wisdom!

I think I try to be honest as best I can, and I have to say I misjudged the man. A few moments later a very attractive lady walked onto the stand. Around fifty years old, she was also immaculately attired and she had definitely not gone to seed. She could have put most twenty year olds to shame. And she was gracious and charming. Her smile even melted the prejudice of a man who had been bored out of his skull for the last hour.

She looked at me with interest. *"He's been boring the pants off you I should think!"* she said. I protested. She smiled.

Numbers one and two went off to look at the car again.

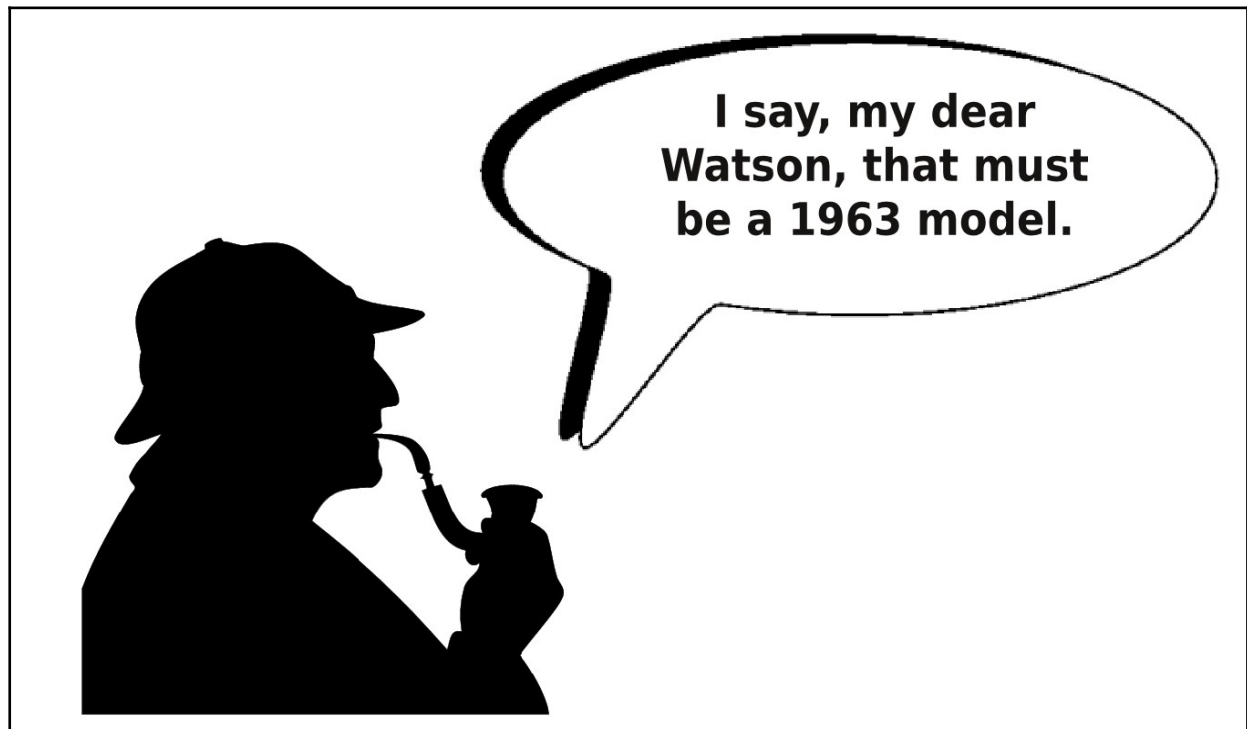
"He's all right! I should know, I've been married to him for nearly thirty years. He has a heart of pure gold, but he's not very clever. He inherited his father's estate and he sits on a few company boards. I've been watching as I went around the show. You really must have a great deal of patience, or you are so desperate for a sale that you'll put up with anything." She turned her eyes away and looked slightly sad as she said *"At times he just needs to express himself and feel adequate."*

We chatted for ten minutes or so. She drove the current year's XJ6 and the husband had his Rolls. I quickly gave her my business card. Number two was her brother who was there just to keep her husband company and to stop him from doing anything stupid. That's why he had nothing to say. She had snared her husband for

his money and they had both profited from the relationship. She saw nothing odd in this or any reason to keep it confidential. Ah! The ways of the British class system!

But I never found out who they were. No names were exchanged and they could have been a group of confidence tricksters ready to strip me clean. I can only take them on face value and the fact that six months later my wife and I were invited with only some fifty or so other fortunates to the Prime Minister's home for an informal dinner with HRH the Prince of Wales. Coincidence? I hope so!

"It's down to the left, just past the bar. Take your time. I'll still be here when you get back."



Business People

In the general area of the stand were a couple of European gentlemen of Teutonic origin, who had a car on display although it was far too expensive for the UK economic climate. I refer to Teutonic origin, so that they cannot identify themselves and sue me! I am not prejudiced against any nationality — just against bad mannered people, no matter where they come from.

Our UK agent also had a friend displaying cars, although at a lower level than ours. He had an attractive wife who knew how to get men interested. As they say, *“all’s fair in love, war and selling classic cars”*. On the last night we all went out for dinner at a restaurant.

I was sitting opposite the Teutons, who both spoke excellent English. The attractive lady's husband had to go off and deliver a car or something, and she received a few comments from the Teutonic group who I think she felt were going a shade too far. So the conversation was split into English at one end and German at the other, with myself in the middle. The Germans could understand the English, but not vice versa.

On the English side we talked about cars and TV programmes and politics and the usual things, including the odd ‘British type’ jokes. The German speaking side chipped in from time to time, but for the most part they talked between themselves in fairly serious terms.

The problem came when one of the waitresses, who looked about twelve but was probably thirteen, spilled red wine over the lap of one of the Teutons. He was really uptight and gave her a severe dressing down. She was almost in tears! Then one of them started to run down the rest of us. On and on they went, all in

German of course. When the attractive lady looked down at their side of the table one of them would smile, raise his glass and proceed to explain which sexual position he would prefer to have her in. I sat in the middle.

After some time I must have twitched or something because, in the middle of the conversation, in German, the more acceptable of the two Teutons (actually quite a pleasant person on his own) said they needed another bottle of wine and asked which one I preferred. With my mind tied up intently in listening to two separate conversations, I immediately answered him in German, saying "*I don't really know*". They became very agitated indeed and the silence from the English speakers was deafening.

The German speakers actually accused me of understanding German, which was hardly a crime, even in England. The English were suspicious because they just did not have a clue about what was going on. I suggested the German speakers were still really upset with the waitress and had been moaning and groaning about the service. Everyone seemed to accept that, but that single event soured the relationship.

So the point I make is that, in this fickle business world when you deal with cultures different from your own, you have to be very careful indeed. Even when you are totally innocent of any wrongdoing, just being there can be a problem.

Six months later I spent five hours negotiating a sale through an interpreter in Europe. After three hours, convinced I did not know what they were saying, they talked among themselves of how they would take delivery of the car at the agreed price and then make complaint after complaint until the warranty value brought it down to the price they wanted to pay. I said nothing, but when they sent their letter of credit to the bank I checked it very carefully. It was as they had planned. I turned down the sale, much to my regret. This

type of action was not untypical of the things you have to put up with when you go chasing orders in foreign countries.

I have, of course, had similar experiences with the Scots, English, Americans, Japanese and Antipodeans. This story is only one of many examples — I genuinely like Teutons.

I hope these comments can help you in your business dealings. The bad guys can spot an honest guy every time and make plans to clean him out. The good guy, by his nature, is not looking for the bad guy, who in any event is very adept at posing as a good guy. So, if you are a decent and honest person, then be warned — the dice are very heavily loaded against you.

“Back in a minute. The wine’s finally made it through the system. I’ll be as quick as I can.”

The office party

We picked them up from home with a fleet of taxis and shovelled them back in again as the clock struck twelve. A great time was reportedly had by all, although what they did to have a great time we could never quite ascertain. Memories were very blurred. My wife and I stayed quite sober and tried to keep things moving along. We failed miserably. The first bottles of spirits lasted but a few minutes. After that it was downhill for the rest of the evening.

We kept the grog coming, then just stayed in the background. A few of the staff moved off around the corner and began to act sheepishly. They began to roll their own cigarettes. I then realised why our paint quality was inconsistent and made sure we never painted a car on pay day or the day after. Painting a car with a fuddled mind is not the path to better quality.

It was good to meet the ladies behind our staff. Some of them were obviously in the driving seat and their husbands were kept well in check. Others were treated by their partners like something the dog had brought in. But most were well balanced relationships and it was good to know that most staff could organise themselves in the domestic arena. There really is nothing as good as an unrestricted 'booze up' to identify problem areas with staff.

After a few drinks more than they should have consumed, some of the ladies take great delight in telling you what you're doing wrong and how you can fix it. From their understanding of things you can generally work out what their husband's views are as well. Remedies usually centred around a very substantial pay increase for their partners.

At ten o'clock the cacophony of sound was unbearable to those not totally inebriated. All the jokes had been heard before but it didn't stop our staff from trying to outdo each other.

My wife and I moved upstairs to the office to allow everyone to let their hair down. By eleven, we were trying to work out how long they might be off work with chronic liver failure. At eleven thirty we were ringing the taxi companies to make sure they would be there at midnight. And the grog still kept flowing. At this stage I realised why the bottle store had said to take the drinks on 'sale or return'. They knew they wouldn't get anything back.

As the taxis arrived we were assured that we were terrific people. There were no words in the world good enough to describe us. I'll bet that wasn't the tone next morning when the hangovers set in. Then it would all be our fault! We waved goodbye to a series of taxis, each with windows filled with glazed, unseeing eyes that had very little knowledge of where they were going, or where they had been. Let the taxi drivers sort them out. They're used to that. It was a great party!

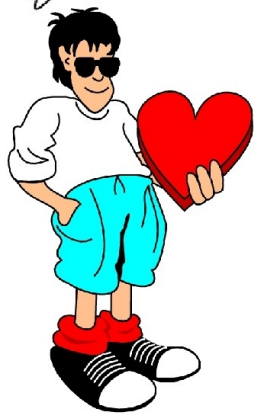
The best party we've ever been to (with the most free drinks).



Have another one



Mary, I think you're wonderful. Do you want to go out on a date?



I have thoughts of you too, Jim



Losing the cool and similar things

Getting the business up and running to produce the required number of cars a year was quite a difficult operation. The biggest problem was that our staff were service oriented, having come from small repair and servicing workshops, and our need was for manufacturing people. So they had to be trained and re-oriented.

I was planning to have parts delivered as close as possible to just before they were needed, but the attitude of the staff was 'work on until you need something and then order it'. It's not easy to change people when they think your methods are out of step with everyone else.

Now, my attitude towards life is not designed to inspire confidence to those unfamiliar with high levels of efficiency. Everything has to be practical and efficient and conventional methods of doing things have to be challenged vigorously at every opportunity.

To our staff, ordering the parts to rebuild a car body, engine, gearbox etc. was not possible until you had bought the car and stripped it down to see what needed done. *“Not so”, I would say, “we set down the specification and then order the parts. If they're not used on this car we'll need them on another.”*

Within a few weeks 'probability theories' were being used, although if you had said 'probability theory' to the staff they would have looked at you blankly. A great number of fairly sophisticated principles were utilised, not as a result of learning academic theories, but as a result of plain, good old-fashioned common sense.

We tried to have as informal an atmosphere as we could, given the necessity of being professional in our dealings with the Japanese. I have a dry sense of humour, at times being understood only by myself. So it took some time for staff to understand I was making a joke, not being critical of one thing or another. If nothing else, I believe I can say that I contributed in a small degree to broadening the sense of humour of quite a few people in the area.

One day my wife called me and said I should go downstairs and look on the notice board. I had been absent from the shop floor for quite some time as I was involved a great deal in correspondence with Japan.

The notice board displayed a picture of me, obviously taken at a party, with my tie apparently cut off halfway up. The bubble over my head said *"he bent over the fax machine and his tie ended up in Japan"*.

Now in the context of the best humour of the decade, it may not be right out there at the top. But it was important to me. Firstly, the staff felt they could do this without incurring my wrath or displeasure. Secondly, it was miles ahead of the humour to date, which comprised of rude words and enormous appendages drawn on to pictures of people.

So we went through a long and laborious conversion process, starting with setting up a system for total control over ordering, deliveries and issuing of materials. When I look back I'm amazed at what we achieved so quickly. It's easy to criticise in the heat of the moment but, in general, our staff responded very well to the demands.

We had many cases of *overheating* as people tried to wrestle with new concepts which seemed to have no value to what we were doing. For instance, it was easy to drive over to the supplier

and pick up a part, telling him to charge it to the business. From deciding the part was needed to fitting it might take twenty minutes.

But I was trying to control the system. Parts had to be officially ordered, I had to sign the order, my wife had to check the computer to ensure there was nothing in stock. Deliveries had to go into the stores, be checked, recorded, and the paperwork sent on to my wife, who would refuse to pay until all the procedures had been adhered to. The staff could do the job in twenty minutes and I was taking days! And I was insisting I was right! We had some mighty disagreements in the early days.

I remember one day when several of us finally flipped. Things had been building up and a couple of staff had some domestic problems. One man's girlfriend had recently taken a drug overdose and another's dog had been injured in a road accident.

Several of us were inspecting a car after it had been painted and I was unhappy with the result. Paint was a major problem for us, as it was the thing where almost anyone can see a flaw. I was unhappy about the colour, which was decidedly dark. The rest of the crew were adamant it was not. I said the car was not being shipped in that condition. They held their ground. At this stage I should say that ninth century Anglo Saxons would have been able to take part in the conversation. Every second word was in their language.

We moved the car outside into the bright sunlight to get the best lighting conditions for inspection. Things built up and up and insults were traded with more severity. It moved on to the stage of screaming at each other. I took off my glasses to wipe the sweat from my face and the colour of the car immediately changed to something totally acceptable.

My painter shouted at me, *"You stupid ****. You've got new glasses!"* And it was true. That very same morning I had taken

delivery of the latest in German technology which, needless to say, darkened as the light intensified. I ate humble pie and waddled off with my tail between my legs.

Still, it was not a major problem for me. Letting off steam had been achieved among the staff, and other unrelated matters and tensions also benefited from this. I took the flak, which was even better since none of the staff was left feeling bad. Things settled down for a long time.

Objectives

I had been involved in setting up manufacturing systems in a variety of industries. The principles of what was needed were quite clear, but we did have a major problem. People involved in the restoration and motor repair businesses are 'service' oriented.

A customer walks in and asks them to fix his car. *"The parts will take three days to get here. You can have it next Tuesday."*

The customer arrives next Tuesday to find the car is not ready. *"Parts were wrong and had to be sent back. It'll be ready on Friday."* There's not much the customer can do, so he accepts the position. And so does everyone else faced with the same problem.

In a manufacturing operation there are a whole series of things which must be planned and organised. Delivery dates mean payment dates. With several hundred thousand dollars tied up in stock and wages to be paid weekly, there is no room for delay. Delay means borrowing money until the customer pays and that means less profit. In most cases we obtained orders in Europe in competition with local restorers, purely on the strength of our reputation for guaranteed delivery dates.

Failing to deliver on time would put us out of business. Things had to happen exactly as they were planned, on the day they were planned, and no excuses could be tolerated.

It was a cultural shock for the staff who had been used to telling the customer with a one day job that the delay could be up to a week. I was asking them to take a 90 day job and guarantee it be completed on time with no delays of any kind. Even with the most co-operative staff it took many months before they re-oriented their thinking.

Setting our practical business objective

The very first time we set an objective, it was that the car should 'look good, drive well and not break down'. Nothing less than that could be contemplated. So then we had to work out how much it should look good and we specified the wood should be re-veneered, the trim should be completely replaced, the body should be taken back to bare metal and fully prepared for painting. We then found it looked silly with the old chrome, so we specified new chrome parts as well. We were able to work out a cost to do this and that became our budget for the work.

To get the car to drive well meant we had to go back to the customer to see what was actually required. Power steering and air conditioning were top of the list. Then we had to put in a gearbox that allowed the driver to drive it like a modern car.

Seats had to be made more comfortable to stop rolling around on corners. Our German customers wanted more leg room and our Japanese customers wanted less. Eventually we were able to produce a specification and cost it out.

The most difficult part was creating reliability. Some people have had good experiences with their Mark 2 and others have had bad experiences.

There are a lot of stories around about the Mark 2 reliability problems, many of which are groundless if the car is properly maintained. But original parts were difficult to get and some of the replacement parts on offer were of very poor quality. In those cases we had to decide if we would put up with their poor quality and advise periodic replacement or fit a different part altogether with the knowledge that it would do the job.

It was the perennial problem of *“how far can you modify a Mark 2 before it ceases to be a Mark 2?”* In the end we put the options to the customers and asked them to make the decision.

At last we had a complete specification and we then knew what we were trying to produce, what the technical, quality and reliability standards were and how much it should cost. By adding our delivery promise we had our complete business objective and we could then set up the whole business to achieve this. Our next step was to define the build of the various cars in the Mark 2 range and set up the computer system to allow us to produce them.

To achieve these objectives we set up a computerised system which controlled our stock, scheduled production, ordered materials and produced exceptionally detailed financial control and analysis. And to make sure it was exactly what we needed we did it all ourselves without any external input.

Our staff worked with us, but were not totally convinced of the need for such a seemingly complex set of systems. We simply had to put the question “Do you know of any other car restoration business which can guarantee delivery on time to the other side of the world for such a complex and unpredictable product?”

Our first task was to produce a specification for the product. This was based upon a simple decision tree. Is it 3.4 or 3.8? Manual or automatic? Left or Right Hand? and so on. After having answered the questions we were left with a specification for the car we needed to build.

By telling the computer to make one it produced a list of the parts needed, told us what we had in stock, what we needed and offered to make up the purchase orders for us. Very civilised indeed, even if I do say so myself.

Now some people may be sceptical in the extreme. What about the quality of the cars and the parts? How can you tell what needs to be done to the engine? It might need new pistons or it might not.

None of these were problems for us. We simply restored everything whether it needed it or not. Only by doing so could we guarantee the quality of the product and satisfy the needs of our customers. Yes, in some ways it was an overkill, but that was what our customers wanted. Money was not the limiting factor.

The only area where pre-planning was difficult was the panel shop. It is almost impossible to be 100% correct when you inspect and buy a car. I was caught several times, much to the disgust of my panel shop staff. It looked good, felt good and, taken together with the mechanical and trim standards, I was convinced the body was going to be perfect. When we finished sand-blasting the body I wanted to strangle the guy who sold it to me! Every trick in the book had been used to make it look good but, at the end of the day, there were an awful lot of panels to be replaced and an awful lot of scarce panel beater's time to be booked out.

So... next time, I sent the panel beaters out to inspect a car. And they got one which was perfect, needing hardly any work. I hung my head and bought them all a beer.

A few weeks later I waved them off at the factory gate as they went off to prove their superiority over management once again. They came back with another perfect specimen. A few days later I went into the panel shop and all the staff suddenly developed the need to go to the toilet simultaneously. They'd bought a lulu! It was even worse than the one I bought. Honour satisfied, I ended up buying the beers again.

We eventually arrived at a standard practice for the bodies. The sills were to be cut off and replaced regardless of their condition. This also allowed the rust prone innards to be fully sand-blasted.

The spare wheel well was invariably replaced, doors were rolled and re-skinned, and a whole series of patch panels fitted. Bonnets and boot lids were replaced from other cars or repaired, simply due to the fact that they were almost impossible to come by. By and large the panel shop could be managed and scheduled like any other part of the operation.

“Well, I think we really must go now. Sorry I can’t be in the office tomorrow, but the problem with a small business is that when a big order is in the offing, you have to go and deal with it yourself. It’s been wonderful meeting you and I’m glad you’re enjoying yourself. I’ll give you a call tomorrow, before you leave.”

The Bills of Material System – *Recipe for a Classic Car*

The operation centred around the Bills of Material. The following pages contain the complete Bills of Material and you should be able to logically follow this through from start to finish. These Bills will provide the basis for understanding how the whole production system worked. In simple terms the basic parts were assembled into the sub assemblies and the sub assemblies were then assembled into the main assembly.

After the Bills of Material there are some forms used as part of the product Quality Control. These are followed by references to other pieces of paperwork, which also have some relevance.

Some Vital Statistics

Mark 2 Jaguar		
	3.4 litre	3.8 litre
Engine (cc)	3442	3781
Bore and Stroke (mm)	83x106	87x106
Maximum Power (bhp)	210 @ 5500	220 @ 5500
Maximum Torque (ft.lbs)	216 @ 3000	240 @ 3000
Manual Gearbox	5 speed	5 speed
Auto Gearbox	Borg Warner Mod 12	Borg Warner Mod 12
Length	4570 (15ft 0in)	4570 (15ft 0in)
Width	1695 (5ft 7in)	1695 (5ft 7in)
Height	1466 (4ft 10in)	1466 (4ft 10in)
Wheelbase	2727 (8ft 11in)	2727 (8ft 11in)
Mass – kg (weight – lbs)	1500 (3304)	1524 (3360)
Original Maximum Speed	192 km/hour (120mph)	200 km/hour (125mph)
0 to 60 miles/hour (manual)	9.1 seconds	8.5 seconds
First Produced	October 1959	October 1959
Manual Production	22095	15383
Auto Production	6571	14758

The Specification

SPECIFICATION		STANDARD MARK 2	DAIMLER MARK 2	3.4 Litre	4.2 Litre	3.8 Litre
ENGINE	Rebore, new pistons, valves etc	-	-	Optional	Optional	☼
	Original parts, replace when necessary	☼	☼	☼	☼	-
RADIATOR	Re-core radiator	Optional	Optional	Optional	Optional	☼
	Test only: repair as necessary	☼	☼	☼	☼	-
CARBS	Fully recondition	Optional	Optional	Optional	Optional	☼
	Repair as necessary	☼	☼	☼	☼	-
GEARBOX	Replace with Borg Warner 12 automatic	-	-	☼	☼	☼
	Repair original gearbox	☼	☼	Optional	Optional	-
DIFFERENTIAL	Strip and fully restore	Optional	Optional	☼	☼	☼
	Repair as necessary	☼	☼	-	-	-
SUSPENSION	New springs front and rear	-	Optional	☼	☼	☼
	Repaired/replaced as necessary	☼	☼	-	-	-
BRAKES	New components & brake lines	-	Optional	☼	☼	☼
	Restored to NZ Govt. standards	☼	☼	-	-	-
ELECTRICS	Fit alternator & upgrade system	-	-	☼	☼	☼
	Use original system	☼	☼	-	-	-
ENGINE BAY	Use new parts where possible	-	-	☼	☼	☼
	Use and repair original parts	☼	☼	-	-	-
WOOD SET	Fully re-veneered	-	-	Optional	Optional	☼
	Repaired as necessary	☼	☼	☼	☼	-
CARPETS	Fully replaced with wool carpet	-	-	Optional	Optional	☼
	Repaired as necessary	☼	☼	☼	☼	-
SEATS	New foam base/leather covered	Optional	Optional	Optional	Optional	☼
	New foam base/leather on front	Optional	Optional	☼	☼	-
	Original seats – unrestored	☼	☼	-	-	-
	Headrests	-	-	Optional	Optional	☼
INTERIOR	Leather doorpads & seatbacks	-	-	Optional	Optional	☼
	Vinyl and fabric	☼	☼	☼	☼	-
STEERING WHEEL	Wood trim – Moto Lita type	☼	☼	☼	☼	☼
	Original	Optional	Optional	Optional	Optional	Optional
BOOT (Trunk)	Fitted high quality synthetic carpet	-	-	Optional	Optional	☼
	Loose fit synthetic mat	☼	☼	☼	☼	-

☼ = Fitted as standard
Optional = Available at extra cost
- = Not available

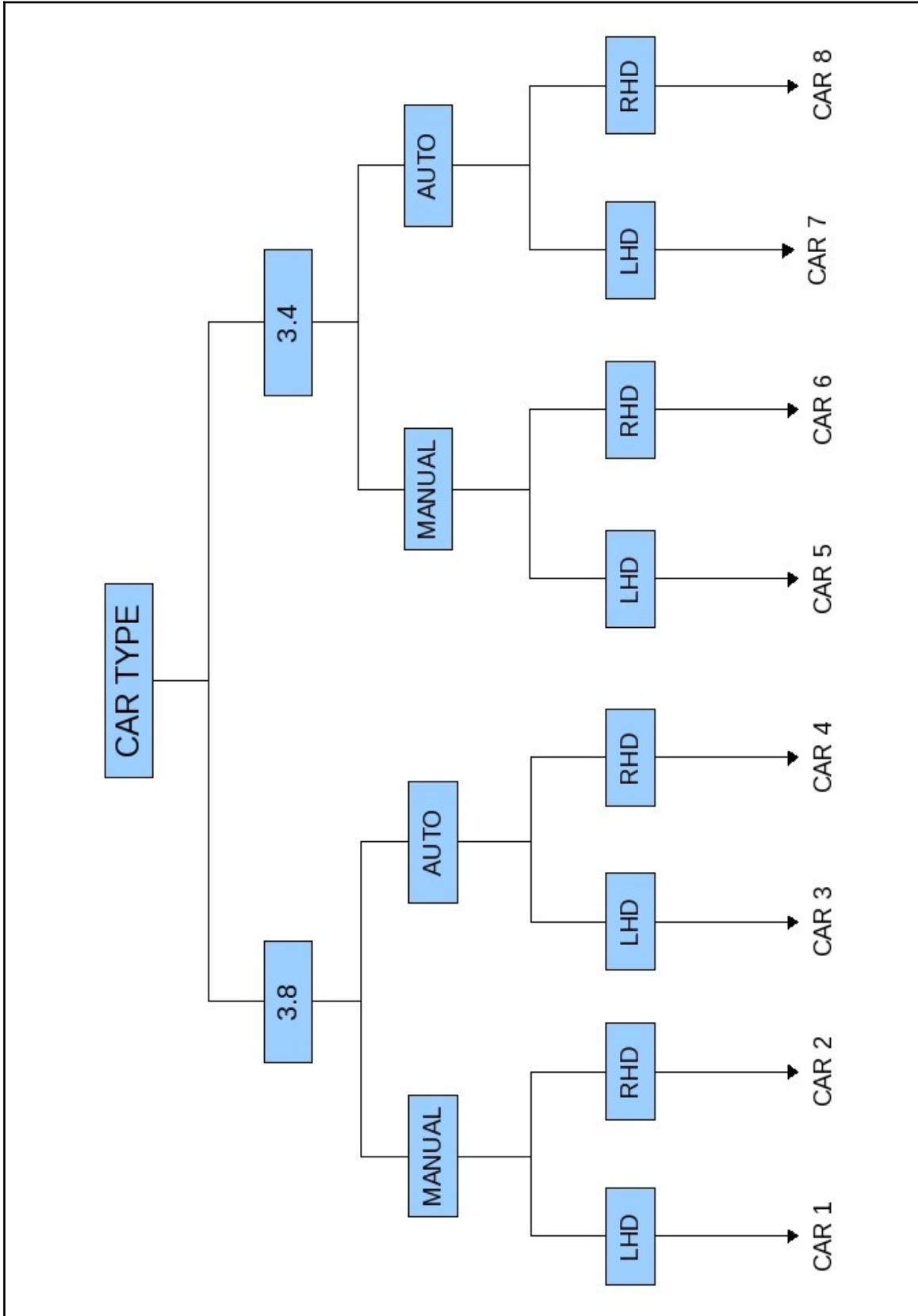
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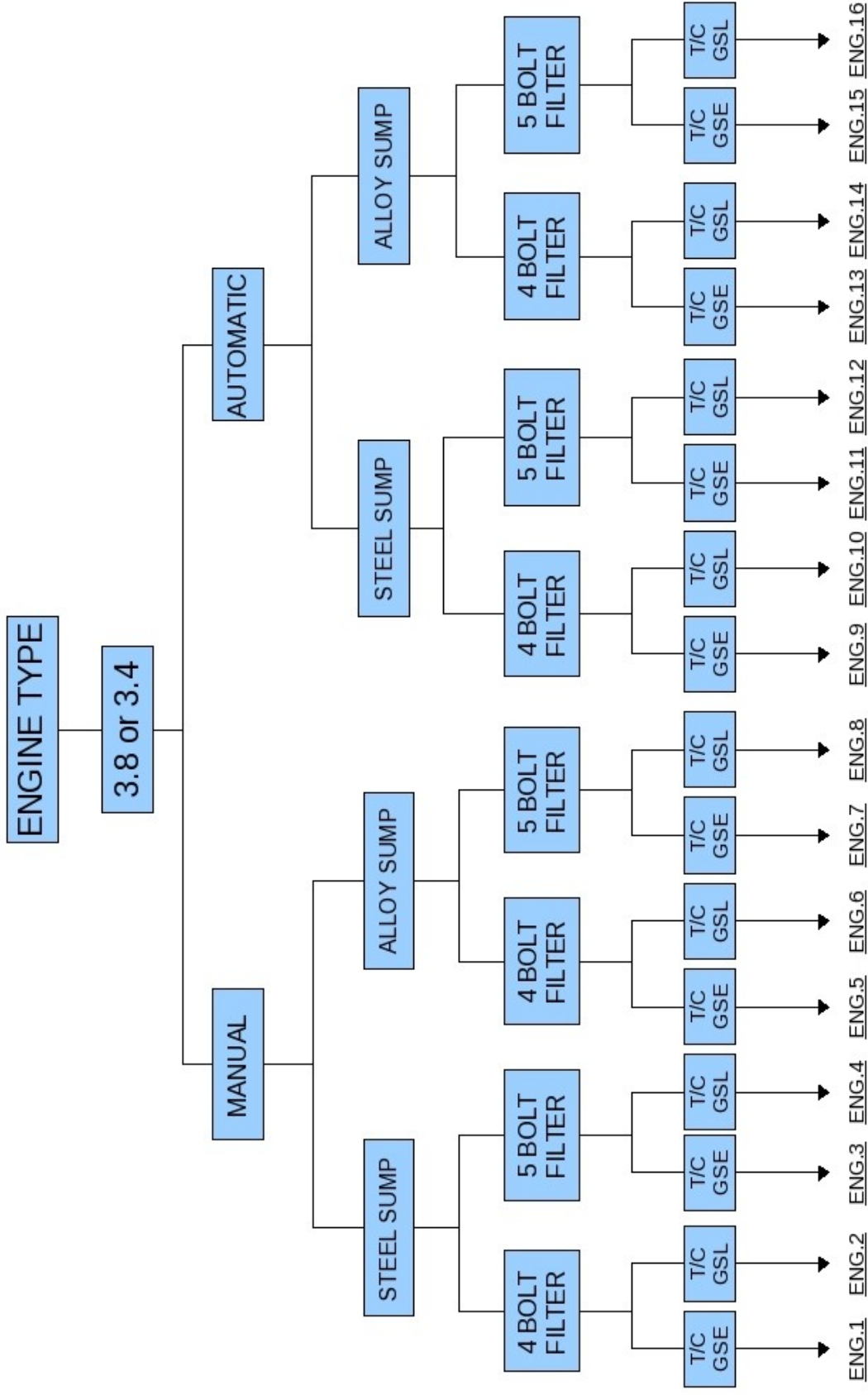
SPECIFICATION		STANDARD MARK 2	DAIMLER MARK 2	3.4 Litre	4.2 Litre	3.8 Litre
WHEELS	Chromed wire wheels, spinners and hubs	Optional	Optional	✱	✱	✱
	Original painted hubs	✱	✱	-	-	-
AIR- CONDITIONING	Air-conditioning System devised in-house	-	-	Optional	Optional	✱
PAINT	Full bare metal respray	Optional	Optional	✱	✱	✱
	Full respray over original paint	Optional	✱	-	-	-
	Repaired as necessary	✱	-	-	-	-
STEERING	Rack and pinion	-	-	✱	✱	✱
	Original type	✱	✱	-	-	-
EXTERIOR	New components when possible	-	Optional	✱	✱	✱
	Replaced as necessary	✱	✱	-	-	-
TYRES	HR rated	Optional	Optional	✱	✱	✱
	Original type – Dunlop SP	✱	✱	-	-	-

✱ = Fitted as standard
 Optional = Available at extra cost
 - = Not available

The Decision Trees



The product was in a continuous state of change and Bills, whilst generally accurate, are for guidance only



FRONT SUSPENSION TYPE

LHD

EARLY TOP ARM

SUSP1

LATE TOP ARM

SUSP2

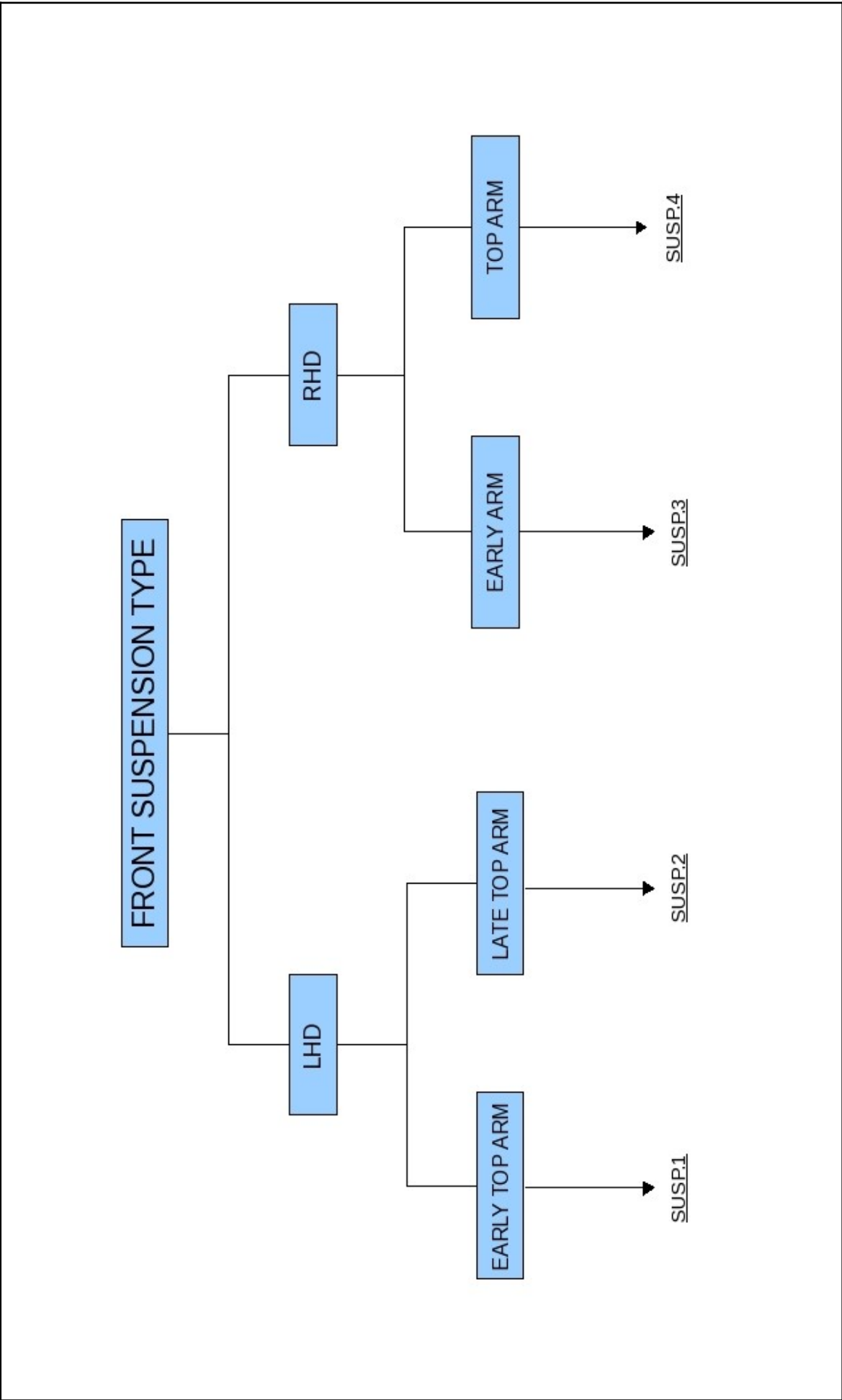
RHD

EARLY ARM

SUSP3

TOP ARM

SUSP4



CAR-1	Rear Susp Transmission-2 Auto Elec.1 Auto Elec.2 Auto Elec.3 SCLHM Assy.01 Assy.02 Assy.03A Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 LHDMBPAssy C15502Assy Assy.19 Assy.22 Assy.24 Assy.26	CAR-3	Rear Susp Transmission Auto Elec.1 Auto Elec.2 Auto Elec.3 SCLHA Assy.01 Assy.02 Assy.03A Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 LHDABPAssy C15502Assy Assy.19 Assy.21 Assy.22 Assy.24 Assy.25
CAR-2	Rear Susp Transmission-2 Auto Elec.1 Auto Elec.2 Auto Elec.3 SCRHM Assy.01 Assy.02 Assy.03 Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 RHDMBPAssy C15501Assy Assy.18 Assy.22 Assy.23 Assy.26	CAR-4	Rear Susp Transmission Auto Elec.1 Auto Elec.2 Auto Elec.3 SCRHA Assy.01 Assy.02 Assy.03 Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 RHDABPAssy C15501Assy Assy.18 Assy.20 Assy.22 Assy.23 Assy.25

CAR-5	Rear Susp Transmission-2 Auto Elec.1 Auto Elec.2 Auto Elec.3 SCLHM Assy.01 Assy.02 Assy.03A Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 LHDMBPAssy C15502Assy Assy.19 Assy.22 Assy.24 Assy.28	CAR-7	Rear Susp Transmission Auto Elec.1 Auto Elec.2 Auto Elec.3 SCLHA Assy.01 Assy.02 Assy.03A Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 LHDABPAssy C15502Assy Assy.19 Assy.21 Assy.22 Assy.24 Assy.27
CAR-6	Rear Susp Transmission-2 Auto Elec.1 Auto Elec.2 Auto Elec.3 SCRHM Assy.01 Assy.02 Assy.03 Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 RHDMBPAssy C15501Assy Assy.18 Assy.22 Assy.23 Assy.28	CAR-8	Rear Susp Transmission Auto Elec.1 Auto Elec.2 Auto Elec.3 SCRHA Assy.01 Assy.02 Assy.03 Assy.04 Assy.05 Assy.06 Assy.07 Assy.08 Assy.09 Assy.10 RHDABPAssy C15501Assy Assy.18 Assy.20 Assy.22 Assy.23 Assy.27

ENG.1 Block Assy.1
 Block Assy.3
 Block Assy.4
 Block Assy.6
 Block Assy.8
 Cylinder Head

ENG.2 Block Assy.1
 Block Assy.3
 Block Assy.4
 Block Assy.6
 Block Assy.9
 Cylinder Head

ENG.3 Block Assy.1
 Block Assy.3
 Block Assy.4
 Block Assy.7
 Block Assy.8
 Cylinder Head

ENG.4 Block Assy.1
 Block Assy.3
 Block Assy.4
 Block Assy.7
 Block Assy.9
 Cylinder Head

ENG.5 Block Assy.1
 Block Assy.3
 Block Assy.5
 Block Assy.6
 Block Assy.8
 Cylinder Head

ENG.6 Block Assy.1
 Block Assy.3
 Block Assy.5
 Block Assy.6
 Block Assy.9
 Cylinder Head

ENG.7 Block Assy.1
 Block Assy.3
 Block Assy.5
 Block Assy.7
 Block Assy.8
 Cylinder Head

ENG.8 Block Assy.1
 Block Assy.3
 Block Assy.5
 Block Assy.7
 Block Assy.9
 Cylinder Head

ENG.9 Block Assy.1
 Block Assy.2
 Block Assy.4
 Block Assy.6
 Block Assy.8
 Cylinder Head

ENG.10 Block Assy.1
 Block Assy.2
 Block Assy.4
 Block Assy.6
 Block Assy.9
 Cylinder Head

ENG.11	Block Assy.1 Block Assy.2 Block Assy.4 Block Assy.7 Block Assy.8 Cylinder Head	ENG.16	Block Assy.1 Block Assy.2 Block Assy.5 Block Assy.7 Block Assy.9 Cylinder Head
ENG.12	Block Assy.1 Block Assy.2 Block Assy.4 Block Assy.7 Block Assy.9 Cylinder Head		
ENG.13	Block Assy.1 Block Assy.2 Block Assy.5 Block Assy.6 Block Assy.8 Cylinder Head		
ENG.14	Block Assy.1 Block Assy.2 Block Assy.5 Block Assy.6 Block Assy.9 Cylinder Head		
ENG.15	Block Assy.1 Block Assy.2 Block Assy.5 Block Assy.7 Block Assy.8 Cylinder Head		

FRONT SUSPENSION :

**SUSP.1 Front Susp.2
 Front Susp.4**

**SUSP.2 Front Susp.2
 Front Susp.3**

**SUSP.3 Front Susp.1
 Front Susp.4**

**SUSP.4 Front Susp.1
 Front Susp.3**

Bill of Materials Issues

Bill of Materials Issue		
Vehicle Reference : CAR.....		Pg 1 of 1
DATE	CODE	PARTICULARS
	ASSEMBLY	Assembly Pick List - Part 1
	ASSEMBLY-2	Assembly Pick List - Part 2
	ASSEMBLY-3	Assembly Pick List - Part 3
	ASSEMBLY-4	Assembly Pick List - Part 4
	AUTO-ELEC	Auto Elec. Pick List - Part 1
	AUTO-ELEC-2	Auto Elec. Pick List - Part 2
	ENGINE	Engine Pick List - Part 1
	ENGINE-2	Engine Pick List - Part 2
	FRONT-SUSP	Front Suspension Pick List
	REAR-SUSP	Rear Suspension Pick List
	TRANSMIS	Transmission Pick List

Bill of Materials Issue

Vehicle Reference : CAR.....

FM-SF-6

Pg 1 of 4

<u>DATE</u>	<u>BILL OF MATERIALS</u>	√
	BLOCKASSY1 : Main Block Components	
	BLOCKASSY2 : Auto Block Components	
	BLOCKASSY3 : Manual Block Components	
	BLOCKASSY4 : Steel Sump	
	BLOCKASSY5 : Aluminium Sump	
	BLOCKASSY6 : 4 Bolt Oil Filter Head	
	BLOCKASSY7 : 5 Bolt Oil Filter Head	
	BLOCKASSY8 : Timing Chain Gear Set Early	
	BLOCKASSY9 : Timing Chain Gear Set Late	
	CYLINDERHEAD : Cylinder Head Components <div> LHDCL 1 LH Carb. Linkage or RHDCL 1 RH Carb. Linkage AE530 1 Cylinder Head Gasket for 3.4 </div>	
	FRONTSUSP.1 : Front Suspension Components RHD	
	FRONTSUSP.2 : Front Suspension Components LHD	
	FRONTSUSP.3 : Late Top Suspension Arm	

Bill of Materials Issue

Vehicle Reference : CAR.....

FM-SF-6

Pg 1 of 4

<u>DATE</u>	<u>BILL OF MATERIALS</u>	√
	BLOCKASSY1 : Main Block Components	
	BLOCKASSY2 : Auto Block Components	
	BLOCKASSY3 : Manual Block Components	
	BLOCKASSY4 : Steel Sump	
	BLOCKASSY5 : Aluminium Sump	
	BLOCKASSY6 : 4 Bolt Oil Filter Head	
	BLOCKASSY7 : 5 Bolt Oil Filter Head	
	BLOCKASSY8 : Timing Chain Gear Set Early	
	BLOCKASSY9 : Timing Chain Gear Set Late	
	CYLINDERHEAD : Cylinder Head Components <div> <div>LHDCL</div> <div>1</div> <div>LH Carb. Linkage</div> </div> <div> <div>or RHDCL</div> <div>1</div> <div>RH Carb. Linkage</div> </div> <div> <div>AE530</div> <div>1</div> <div>Cylinder Head Gasket for 3.4</div> </div>	
	FRONTSUSP.1 : Front Suspension Components RHD	
	FRONTSUSP.2 : Front Suspension Components LHD	
	FRONTSUSP.3 : Late Top Suspension Arm	

Bill of Materials Issue

Vehicle Reference : CAR.....

FM-SF-6

Pg 2 of 4

<u>DATE</u>	<u>BILL OF MATERIALS</u>	√
	REARSUSP : Rear Suspension Components C16348E 1 RH Early Caliper Assy C16349E 1 LH Early Caliper Assy or C18613L 1 RH Late Caliper Assy C18614L 1 LH Late Caliper Assy	
	TRANSMISSION : Automatic Transmission	
	AUTOELEC1 : Various Autoelectrical Components LHSC 1 LH Speedo Cable or RHSC 1 RH Speedo Cable	
	AUTOELEC2 : Lights C20735 1 Pr Lights, Fog or BD17339 2 Grille Horn	
	AUTOELEC3 : Dash Components BD19725 1 LH Glovebox or BD19726 1 RH Glovebox C15610 1 LH Indicator Strip or C15609 1 RH Indicator Strip	
	SCRHA : RH Auto Steering Column	
	SCRHM : RH Manual Steering Column	
	SRLHA : LH Auto Steering Column	
	SCLHM : LH Manual Steering Column	

Bill of Materials Issue

Vehicle Reference : CAR.....

FM-SF-6

Pg 3 of 4

<u>DATE</u>	<u>BILL OF MATERIALS</u>	√
	ASSY01 : Door Components	
	ASSY02 : Plugs, Washers, Wipers	
	ASSY03 : Brake Components RHD	
	ASSY03A : Brake Components LHD	
	ASSY04 : Fuel Components	
	ASSY05 : Exterior First Assmbly	
	ASSY06 : Mechanical First Assembly	
	ASSY07 : Air Conditioner	
	ASSY08 : Exterior Second Assembly	
	ASSY09 : Mechanical Second Assembly	
	ASSY10 : Accelerator Long Pedal	
	ASSY11 : Accelerator Short Pedal	
	RHDABPASSY : RH Auto Brake Pedal	
	LHDABPASSY : LH Auto Brake Pedal	
	RHDMBPASSY : RH Manual Brake and Clutch	
	LHDMBPASSY : LH Manual Brake and Clutch	
	C15501ASSY : RH Handbrake	

Bill of Materials Issue

Vehicle Reference : CAR..... FM-SF-6 Pg 4 of 4

FM-SF-6

<u>DATE</u>	<u>BILL OF MATERIALS</u>	✓
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BILL OF MATERIALS

✓

	C15502ASSY : LH Handbrake	
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	ASSY18 : RH Wood Set	
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	ASSY19 : LH Wood Set	
--	----------------------	--

	ASSY20 : RH Auto Mechanical Components	
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	ASSY21 : LH Auto Mechanical Components	
--	---	--

	ASSY22 : Trim Components	
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	ASSY23 : Power Steer Components RHD	
--	--	--

	ASSY24 : Power Steer Components LHD	
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	ASSY26	: Badge Kit 3.8	
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	ASSY28	: Badge Kit 3.4	
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Assembly Lists

BLOCKASSY1 : Main Block Assembly			Pg 1
Component Part Number	Component Description	Unit Meas.	Quantity Required
C34744STD	Washer, STD, Oil Thrust	Each	1.00
C34744-004	Washer, Oil Thrust	Each	1.00
LS874	Seal, Sump	Each	1.00
C40147	Piece, Distance	Each	1.00
EAC8101	O-Ring	Each	1.00
LTB1	Plug, Brass Frost, 1"	Each	1.00
C4283	Plug, Crankshaft	Each	6.00
C19648/S	Cover, Rear Main + 5 Allen Screws	Each	1.00
C4240044	Seal, Main, Rear	Each	1.00
C2352	Plug, Oil Gallery	Each	7.00
C2283	Thrower, Oil	Each	1.00
JG015Z	Stud, Head, New	Each	13.00
JG126Z	Stud, Dowelled, Head, New	Each	1.00
C5896	Bolt, Crankshaft	Each	1.00
C2486	Washer, Crankshaft	Each	1.00
C2467	Washer, Lock, Crankshaft	Each	1.00
C4810N	Plate, Lock, Crankshaft	Each	1.00
EAC8815	Seal, Crankshaft, Front	Each	1.00
C23435	Washer, Sump Plug + Copper	Each	1.00
BJCPI	Pulley, Crankshaft Belt	Each	1.00
C19090COMP	Mount, Engine, Front, LH	Each	1.00
C11481	Mount, Engine, Front, RH	Each	1.00
C4794	Mount, Engine and Bumper	Each	2.00
C8646	Shaft, Oil Pump	Each	1.00
C2152	Gear, Oil Pump	Each	1.00
C9294	Bolt, Oil Pump	Each	3.00
C8648	Coupling, Oil Pump	Each	1.00
VO16-3	Pump, Oil	Each	1.00
C10332	Tensioner	Each	1.00
C15694	Pump, Water	Each	1.00
C7548	Hose, Water Bypass	Each	1.00
BJWPPI	Pulley, Water Pump Belt	Each	1.00
C12424	Hose, Radiator, Top	Each	1.00
C27106	Hose, Radiator, Bottom	Each	1.00
C4795	Bracket, Bell Housing, LH	Each	1.00
C4796	Bracket, Bell Housing, RH	Each	1.00
CWP+B	Jockey Puley and Bracket Assembly	Each	1.00
BJALTB1	Bracket, Alternator	Each	1.00
BJALTB2	Bracket, Alternator	Each	1.00
BJPSLB	Bracket, Power Steering, Lower	Each	1.00
BJPSUB	Bracket, Power Steering, Upper	Each	1.00
BJALTAR	Rod, Alternator Adjuster	Each	1.00
BJCAR	Rod, Compressor Adjuster	Each	1.00
BJPSAR	Rod, Power Steering Adjuster	Each	1.00
BJALTA	Adjuster, Alternator	Each	1.00
BJCA	Adjuster, Compressor	Each	1.00
BJPSA	Adjuster, Power Steering	Each	1.00
BJCBC	Base, Compressor	Each	2.00
cont'd ... Pg 2			

BLOCKASSY1 : Main Block Assembly

Pg 2

Component Part Number	Component Description	Unit Meas.	Quantity Required
C10940	Bush, Stabilizer + Sway Bar Link	Each	1.00
C20218	Bush, Gearbox Mount	Each	1.00
C12890	Link	Each	1.00
C11607	Washer	Each	1.00
C11688	Washer	Each	1.00
5/8PUSHLOK	Hose, 5/8", Sump to Oil Filter	cm.	15.00
BJPSBAUTC	Base, Power Steer, Upper Alternator	Each	1.00
56110	Power Steering Pump & Pulley	Each	1.00
BXH1231	Alternator	Each	1.00
60600723	Kit, Ignition	Each	1.00
C15552	Bracket, Return Spring	Each	1.00
SSIIOC	Battery Earth Strap	Each	1.00
5/8HEATER	Hose, 5/8", Water Pump	Each	1.00
3/8MFL	Valve, Water Ball	Each	1.00
GTX2	Oil, Turbo Tested, 4 Litre	4xLtr	2.00
3300x6	Fitting	Each	1.00
PSKIT	Kit, Fittings, Power Steering	Each	1.00

BLOCKASSY2 : Auto Block Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C6861	Plate	Each	1.00
C6862	Dowel, Fly Wheel	Each	2.00
C4855	Bolt, Fly Wheel	Each	10.00
BJAKDB	Bracket, Auto Kick Down	Each	1.00
851	Switch, Micro	Each	1.00
CES2550	Motor, Starter	Each	1.00
BJPESS	Spacer, Starter Motor	Each	1.00
EAC8973	Flexiplate	Each	1.00
200x3x2	Fitting, Manifold Vacuum	Each	1.00
BJTCPB	Bracket	Each	2.00

BLOCKASSY3 : Manual Block Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C2226	Bush, Spigot	Each	1.00
C2313	Dowel	Each	2.00
C23328	Flywheel	Each	1.00
C4855N	Bolt, Fly Wheel	Each	10.00
C12731	Bracket	Each	1.00
C11603	Hose, Clutch	Each	1.00
P4	Nut	Each	2.00
P4285	Nut, Tube, Brake Pipe	Each	1.00
C12679	Motor, Starter	Each	1.00
202x3x2	Fitting, Manifold Vacuum	Each	1.00

BLOCKASSY4 : Steel Sump

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16903	Plate, Sump Cover	Each	1.00
C16905	Strainer, Sump	Each	1.00
C20003	Sump, Steel	Each	1.00
C10536	Pipe, Oil Suction	Each	1.00
C8608	Pipe, Oil Suction	Each	1.00

ASSY04 : Fuel Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C3053	Mount, Rubber, Fuel Tank	Each	6.00
7950001	Filter, Fuel, AC	Each	1.00
GF124	Element, Fuel Filter, AC	Each	1.00
C22273	Spring	Each	1.00
FF3022	Filter	Each	1.00
MGLC15	Cap, Locking, Fuel Tank	Each	1.00
BD9898	Neck, Rubber, Fuel Filter	Each	1.00
C13705	Bolt, Banjo, Fuel Filter	Each	1.00
60x5	Fitting, Fuel Pipe	Each	1.00
105x5	Union, Fuel Pipe	Each	1.00
EP10	Pump, Fuel	Each	1.00
4.75BS	Tube, Bundy, Used for Brakes	cm.	800.00
7.95BS	Tube, Steel, Main Fuel	cm.	800.00
4219G	Line, 5/16", Fuel	cm.	140.00
C17565ASSY	Tank, Fuel	Each	1.00
R314/8	Grommet, Rubber, No. 8	Each	1.00
GA27001	Tube, Fuel, 3/16"	cm.	30.00

BLOCKASSY8 : Timing Chain Gear Set Early

Component Part Number	Component Description	Unit Meas.	Quantity Required
C2255	Timing Chain	Each	1.00
C2256	Timing Chain	Each	1.00
C13614	Damper	Each	1.00
C13615	Damper	Each	1.00
C13616	Damper	Each	1.00
C13617	Damper	Each	1.00
C13660	Spacer	Each	4.00

BLOCKASSY9 : Timing Chain Gear Set Late

Component Part Number	Component Description	Unit Meas.	Quantity Required
C2255	Timing Chain	Each	1.00
C2256	Timing Chain	Each	1.00
C13614	Damper	Each	1.00
C21815	Damper	Each	1.00
C13616	Damper	Each	1.00
C13617	Damper	Each	1.00
C13660	Spacer	Each	4.00

CYLINDERHEAD : Cylinder Head Components

Pg 1

Component Part Number	Component Description	Unit Meas.	Quantity Required
C8000STD	Bearing, Camshaft	Each	1.00
C25619	Pipe, Cam Oil	Each	1.00
C5846	Bolt, Banjo, Oil Pipe	Each	3.00
3152X4	Plug, Keyser Fitting	Each	1.00
209x10x6	Fitting, Water Pump	Each	4.00
3152x6	Plug, Water Pump	Each	1.00
202x6x2	Fitting, Manifold Vacuum	Each	1.00
C8048	Cover, Breather	Each	1.00
C8604/1	Gauze, Breather	Each	1.00
C18399	Manifold, Rear Exhaust	Each	1.00
C1022	Cap, Camshaft Oil Fill	Each	1.00
C2310	Screw, Camshaft	Each	4.00
C18398	Manifold, Front Exhaust	Each	1.00
C18399	Manifold	Each	1.00
C2369	Stud - Manifold Flange	Each	8.00
C14651	Manifold, Inlet	Each	1.00
C14661	T-Piece, Choke Pipe	Each	1.00
C12422N	Housing, Thermometer	Each	1.00
AC1311	Thermostat	Each	1.00
BJWTFI	Fitting, Keysor	Each	1.00
SP5158	Temp Sender	Each	1.00
N11YC	Plug, Spark	Each	6.00
JG007P	Nut, Cam Cover	Each	23.00
JG006P	Nut, Head Stud	Each	14.00
JG062PC	Washer, D	Each	6.00
JG118K	Washer, Round	Each	8.00
C19043	Cover, Camshaft End	Each	2.00
C7136	Spring, Valve, Inner	Each	12.00
C7137	Spring, Valve, Outer	Each	12.00
JG120Z	Stud, Inlet Manifold	Each	26.00
JG122Z	Stud, Manifold	Each	14.00
BJCMS	Stud, Manifold	Each	8.00
C15549	Bracket	Each	1.00
C14366	Spring, Front Throttle Return	Each	1.00
C13355	Spring, Rear Throttle Return	Each	1.00
DLB101	Coil, Ignition	Each	1.00
C8047	Bracket, Ignition Coil	Each	1.00
C18525	Bracket, Ignition Coil, Bottom	Each	1.00
AWSE	Washer Set, Engine, Alloy	Each	1.00
CE541	Gasket Set, Head	Each	1.00
AE541C	Gasket, Head Composition	Each	1.00
EE532	Set, Block Gasket	Each	1.00
C15800	Pipe, Water	Each	1.00
7325	Belt, Water Pump	Each	1.00
11A0825	Belt, Power Steering	Each	1.00
7250	Belt, Fan, Alternator	Each	1.00
9350	Belt, Fan	Each	1.00
HT	Lead Set, HT	Each	1.00

CYLINDERHEAD : Cylinder Head Components

Pg 2

Component Part Number	Component Description	Unit Meas.	Quantity Required
1X	Clip, Hose, 30-40mm	Each	2.00
0X	Clip, Hose, 18-25mm	Each	5.00
2A	Clip, Hose, 35-50mm	Each	2.00
2	Clip, Hose, 40-55mm	Each	2.00
GA27004	Hose, Gates, 3/8 Fuel	cm.	20.00
MH4	Clip, Hose, Choke	Each	4.00
C14987/1	Cover, Camshaft, RH	Each	1.00
C19042	Cover, Camshaft, LH	Each	1.00
C2243	Shim	Each	12.00
AUC992SUB	Carburettors	Pair	1.00

FRONTSUSP.1 : Front Suspension Components RHD

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13686	Hose, Brake, Front	Each	2.00
GB035Z	Nut, Clutch Hose	Each	2.00
C15648	Caliper, Assembly RH	Assy	1.00
C15649	Caliper, Assembly LH	Assy	1.00
MDP704	Pads, Disc	Each	1.00
C23484	Discs, Front	Each	2.00
C15901	Pipe, Brake, RH	Each	1.00
C15902	Pipe, Brake, LH	Each	1.00
C13918	Buffer, Rubber	Each	2.00
SETA	Bearing, Hub, Front	Each	2.00
SETB	Bearing, Hub, Front	Each	2.00
PR1531	Seal, Hub Oil, Front	Each	2.00
C15319	Fulcrum, Shaft	Each	2.00
JG023Y	Washer, Suspension	Each	4.00
JG024Y	Washer, Suspension	Each	4.00
JG025Y	Washer, Suspension	Each	4.00
C8672	Bush, Suspension	Each	4.00
C8673	Bush, Suspension	Each	4.00
C9004	Mount, V, Suspension, Front	Each	2.00
C8925	Bolt, Mount Housing Bracket	Each	2.00
C8689	Bracket, Mount Housing	Each	2.00
C10996	Bush, Sway Bar	Each	4.00
C10940	Bush, Stabilizer+Sway Bar Link	Each	2.00
C23314	Mount, Suspension, Front	Each	2.00
C3400	Washer, D	Each	2.00
SRMB	Bush, Rack Mounting	Each	3.00
C20764	Link, Sway Arm	Each	2.00
C11045	Washer, Sway Bar	Each	4.00
CAC9937	Joint, Steering Ball	Each	2.00
CAC9938	Joint, Steering Ball	Each	2.00
C10778	Shaft, Wishbone	Each	2.00
C15328	Arm, Bott Suspension	Each	2.00
C15699	Plate, Bott Spring, RH	Each	1.00
C15700	Plate, Bott Spring, LH	Each	1.00
BJSRMRH	Mount, RH Rack	Each	1.00
C19224R	Stub Axle Assembly, RH	Each	1.00
C19224L	Stub Axle Assembly, LH	Each	1.00
BJFHR	Hubs, Front, RH	Each	1.00
BJFHL	Hubs, Front, LH	Each	1.00
C14035	Bar, HD Sway	Each	1.00
R4039	Shock Absorber, Front	Each	2.00
C23502	Front Suspension Cross Member	Each	1.00
SNELLFR	Coil, Front	Pair	1.00
M14X1.5	Nut, Lock, Metric	Each	2.00
XJ6RR	Rack, Steering, RH	Each	1.00
1/2UNFCASTLE	Nut, Castle	Each	4.00
9/16UNFCASTLE	Nut, Castle	Each	6.00
QR1840S	End, Tie Rod	Each	2.00
C22355	Coupling, Steering Column	Each	1.00

FRONTSUSP.2 : Front Suspension Components LHD

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13686	Hose, Brake, Front	Each	2.00
GB035Z	Nut, Clutch Hose	Each	2.00
C15648	Caliper, Assembly RH	Assy	1.00
C15649	Caliper, Assembly LH	Assy	1.00
MDP704	Pads, Disc	Each	1.00
C23484	Discs, Front	Each	2.00
C15901	Pipe, Brake, RH	Each	1.00
C15902	Pipe, Brake, LH	Each	1.00
C13918	Buffer, Rubber	Each	2.00
SETA	Bearing, Hub, Front	Each	2.00
SETB	Bearing, Hub, Front	Each	2.00
PR1531	Seal, Hub Oil, Front	Each	2.00
C15319	Fulcrum, Shaft	Each	2.00
JG023Y	Washer, Suspension	Each	4.00
JG024Y	Washer, Suspension	Each	4.00
JG025Y	Washer, Suspension	Each	4.00
C8672	Bush, Suspension	Each	4.00
C8673	Bush, Suspension	Each	4.00
C9004	Mount, V, Suspension, Front	Each	2.00
C8925	Bolt, Mount Housing Bracket	Each	2.00
C8689	Bracket, Mount Housing	Each	2.00
C10996	Bush, Sway Bar	Each	4.00
C10940	Bush, Stabilizer+Sway Bar Link	Each	2.00
C23314	Mount, Suspension, Front	Each	2.00
C3400	Washer, D	Each	2.00
SRMB	Bush, Rack Mounting	Each	3.00
C20764	Link, Sway Arm	Each	2.00
C11045	Washer, Sway Bar	Each	4.00
CAC9937	Joint, Steering Ball	Each	2.00
CAC9938	Joint, Steering Ball	Each	2.00
C10778	Shaft, Wishbone	Each	2.00
C15328	Arm, Bott Suspension	Each	2.00
C15699	Plate, Bott Spring, RH	Each	1.00
C15700	Plate, Bott Spring, LH	Each	1.00
BJSRMLH	Mount, LH Rack	Each	1.00
C19224R	Stub Axle Assembly, RH	Each	1.00
C19224L	Stub Axle Assembly, LH	Each	1.00
BJFHR	Hubs, Front, RH	Each	1.00
BJFHL	Hubs, Front, LH	Each	1.00
C14035	Bar, HD Sway	Each	1.00
R4039	Shock Absorber, Front	Each	2.00
C23502	Front Suspension Cross Member	Each	1.00
SNELLFR	Coil, Front	Pair	1.00
M14X1.5	Nut, Lock, Metric	Each	2.00
LHDSR	Rack, Steering, RH	Each	1.00
1/2UNFCASTLE	Nut, Castle	Each	4.00
9/16UNFCASTLE	Nut, Castle	Each	6.00
C22355	Coupling, Steering Column	Each	1.00

FRONTSUSP.3 : Late Model Top Steering Arm

Component Part Number	Component Description	Unit Meas.	Quantity Required
C17177	Arm, Top Steering LHF/RHR	Each	2.00
C17176	Arm, Top Steering RHF/LHR	Each	2.00
C17172	Stop, Rubber Rebound	Each	2.00
M10x110	Bolt, Top Ball Joint, Inner	Each	2.00
M10x80	Bolt, Top Ball Joint, Outer	Each	2.00
M10NYLOC	Nut, Bolt - Self Locking	Each	4.00

FRONTSUSP.4 : Early Model Top Steering Arm

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16798	Arm, Top Steering LHF/RHR	Each	2.00
C16799	Arm, Top Steering RHF/LHR	Each	2.00
C15701	Stop, Rubber Rebound	Each	2.00
M10x110	Bolt, Top Ball Joint, Inner	Each	2.00
M10x80	Bolt, Top Ball Joint, Outer	Each	2.00
M10NYLOC	Nut, Bolt - Self Locking	Each	4.00

REARSUSP : Rear Suspension Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13685	Adaptor, 3-Way	Each	1.00
C13687	Hose, Brake, Rear	Each	1.00
GB035Z	Nut, Clutch Hose	Each	1.00
MDP704	Pads, Disc	Each	1.00
60-6	Pin, Brake Clevis	Each	4.00
C13605	Disc, Brake, Rear	Each	2.00
C20745	Compensator, Hand Brake	Each	1.00
C19495	Cable, Brake, Short	Each	1.00
C19496	Cable, Brake, Long	Each	1.00
C7860	Clip, Pipe Retaining	Each	2.00
C15556	Pipe, Brake, LH	Each	1.00
C15557	Pipe, Brake, RH	Each	1.00
C11091	Bar, Torsion	Each	2.00
C8949	Bush, Torsion Bar	Each	4.00
KJG104	Rod, Panhard	Each	1.00
4144	Seal, Rear Axle	Each	2.00
3840	Seal, Pinion	Each	1.00
02820	Bearing, Diff, Outer Cup-Pinion	Each	1.00
02872	Bearing, Diff, Outer Cone-Pinion	Each	1.00
14130	Bearing, Rear Axle, Side Cone	Each	2.00
14276	Bearing, Rear Axle, Side Cup	Each	2.00
25523	Bearing, Diff, Carrier Cup	Each	2.00
25577	Bearing, Diff, Carrier Cone	Each	2.00
31520	Bearing, Diff, Inner Cup-Pinion	Each	1.00
31593	Bearing, Diff, Inner Cone-Pinion	Each	1.00
CR18658	Seal, Hub	Each	2.00
7953	Retainer, Oil Seal	Each	2.00
C16287	Plate, Caliper Mounting Adaptor	Each	1.00
C16288	Plate, Adaptor	Each	1.00
BJRHR	Hubs, Rear, RH	Each	1.00
BJRHL	Hubs, Rear, LH	Each	1.00

TRANSMISSION : Automatic Transmission

Component Part Number	Component Description	Unit Meas.	Quantity Required
12	Gearbox, Auto, Mod.12	Each	1.00
9/16x4	Bolt, Transmission Mount	Each	1.00
C19276	Mount	Each	1.00
FX121	Band, Front	Each	1.00
113A155	Band, Brake, Rear	Each	1.00
12A66	Plate, Clutch	Each	8.00
3-37	Spring, Clutch	Each	1.00
CR21211	Seal	Each	1.00
6307ZNR	Bearing	Each	1.00
81603R	Filter	Each	1.00
4830G	Bearing	Each	1.00
1003247001	Modulator, Vacuum	Each	1.00
C25817	Lever	Each	1.00
BJ1SA	Adaptor	Each	1.00
RTC36	Switch	Each	1.00
BJACB	Bracket, Auto	Each	1.00
424813/2	Pin, Ball	Each	1.00
22246-RX	Kit, Overhaul	Each	1.00
0412-511008A	Converter, Mod. 12	Each	1.00
5/16NT	Tube	cm.	150.00
14MM	Clip, Hose	Each	1.00
GA27001	Hose, 3/16	cm.	30.00
49450	Hose, 5/16 Transmission Cooler	cm.	100.00
4.75BS	Tube, Bundy, 3/16	cm.	100.00
12MM	Clip, Hose	Each	2.00
3400x2x2	Fitting	Each	1.00
209x5x2	Fitting	Each	2.00
MH4	Clip, Hose	Each	2.00
C12888	Bracket	Each	1.00
C12889	Bracket	Each	1.00
41432	Bush, Front Pump	Each	1.00
C25152	End, Cable	Each	1.00

TRANSMISSION-2 : 5 Speed Getrag

Component Part Number	Component Description	Unit Meas.	Quantity Required
EAC8195	Gearbox, Getrag, 5 speed	Each	1.00
EAC6023	Switch, Reverse	Each	1.00
EAC5358	Housing, Speedo Gear	Each	1.00
C9177	O-Ring, Speedo Housing	Each	1.00
EAC6268	Knob, Gear Lever	Each	1.00
EAC7657	Lever, Gear	Each	1.00
EAC5268	Extension	Each	1.00
EAC5753	Mount, Gear Lever	Each	1.00
EAC5752	Mount, Alloy	Each	1.00
EAC5751	Mount, Alloy	Each	1.00
UKC1090J	Mount, Rubber	Each	4.00
EAC4902	Mount, Steel	Each	4.00
EAC1896	Nut, Knob, Locking	Each	1.00
EAC9855	Spring, Gear Lever	Each	1.00
BH108241	Bolt, Mounting	Each	2.00
EAC5261	Retainer, Spring	Each	2.00
ACU1381	Circlip, Spring Retaining	Each	1.00
C24145	Cylinder, Slave, Clutch	Each	1.00
C9798	Rod, Adjusting	Each	1.00
C10360	Adjuster	Each	1.00
3.4CP	Pack, Clutch	Each	1.00
EAC8595	Plate, Clutch Driven	Each	1.00
C14494	Housing, Bell	Each	1.00
C9797	Fork, Release Brg	Each	1.00
C9857	Shaft,	Each	1.00
C9801	Pin, Pivot	Each	1.00
C5178	Plate, Spring Return	Each	1.00
C5120	Spring, Return	Each	1.00
C25943	Mount	Each	1.00
9/16x4	Bolt	Each	1.00
C19276	Plate	Each	1.00
C12888	Bracket	Each	1.00
C12889	Bracket	Each	1.00

AUTOELEC1 : Various Auto Electrical Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16778	Housing, Heater	Each	1.00
CP16516	Fan, Deraile Electric	Each	1.00
247/32	Cable, Starter	cm.	60.00
BSIOC	Cable, Battery lead	Each	1.00
4973	Block, Relay	Each	4.00
20-200-100	Relay	Each	5.00
60A	Lugs, Cable	Each	4.00
BT6	Terminal, Battery	Each	1.00
92H	Horn, High Tone	Each	1.00
92L	Horn, Low Tone	Each	1.00
C2639	Switch, Dip	Each	1.00
R261	Cover, Dip Switch	Each	1.00
FB4R	Box, Fuse	Each	1.00
C9653	Switch, Door, Light, Interior	Each	4.00
R314/12	Grommet, Rubber, No. 12	Each	6.00
C20686	Base, Fuse Box	Each	1.00
C15591	Fan, heater	Each	1.00
HMC	Cover, Heater Motor	Each	1.00
C16676	Panel, End Heater Housing	Each	1.00
BJFBC	Cover, Fuse Box	Each	1.00
C16774	Radiator, Heater	Each	1.00
HCI	Cable, Heater, Inner	Each	2.00
HCO	Cable, Heater, Outer	Each	2.00
C15711	Motor, Heater	Each	1.00
C16559	Valve, Heater	Each	1.00
C9928	O-Ring, Heater	Each	1.00
C13824	Clip	Each	1.00
C16555	Hose, Heater Box	Each	2.00
0X	Clip, Hose, 18-25mm	Each	2.00
M7	Kit, Central Locking	Each	1.00
LAFT1	Timer, Electric Fan	Each	1.00
12x6x4	Seal, Sponge	Each	1.00

SUB-ASSEMBLY - C20735 : Fog Lights (Makes 1 Pair)

Component Part Number	Component Description	Unit Meas.	Quantity Required
9012	Rim, Fog Lamp, Chrome	Each	2.00
FLFA	Embellisher, Fog Lamp, Chrome	Each	2.00
FLFB	Shell, Fog Lamp, Chrome	Each	2.00
FLFC	Plate, Fog Lamp, Connector	Each	2.00
FLFD	Bolt, Hollow, Fog Lamp, Chrome	Each	2.00
LUB110	Light Unit, Fog Lamp	Each	2.00
689	Bulb, Fog Lamp	Each	2.00

SUB-ASSEMBLY - KJG104 : Panhard Rod

Component Part Number	Component Description	Unit Meas.	Quantity Required
C14140	Panhard Rod	Each	1.00
C10995	Bush	Each	4.00
C11043	Washer	Each	4.00
C11042	Washer	Each	4.00
JG143Y	Screw, Panhard Rod End	Each	1.00

SUB-ASSEMBLY - C10791ASSY : Rear Spring Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C10791	Spring, Rear Leaf	Each	1.00
C10843	Mount, Rear Spring	Each	2.00
C8939	Bush, Spring Eye	Each	2.00
C10844	Mount, Rear Spring	Each	4.00

SUB-ASSEMBLY - C24207ASSY : Radiator Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C24207	Radiator	Each	1.00
RADCORE	Radiator Core	Each	1.00
75004	Switch	Each	1.00
RCI	Radiator Cap	Each	1.00
DC4	Tap, Radiator Drain	Each	1.00
5/16NT	Tube, Nitrile	cm.	75.00
C24965	Shroud, Radiator	Each	1.00

SUB-ASSEMBLY - C17565ASSY : Fuel Tank Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C17565	Tank, Fuel	Each	1.00
3224x4x2	Fitting, Fuel Tank Return	Each	1.00
C1617	Gasket, Tank Filter	Each	1.00
C23752	Filter, Fuel Tank	Each	1.00
C937	Gasket, Fuel Sender	Each	1.00
C15476	Sender, Fuel Gauge	Each	1.00
3/16NT	Tube	cm.	42.00
209x3x2	Fitting, Fuel Return	Each	1.00

SUB-ASSEMBLY - 7088/9 : Reconditioned Carb. Bases

Component Part Number	Component Description	Unit Meas.	Quantity Required
AUC8265	Body, Assembly	Each	2.00
AUD3080	Bush, Throttle Shaft	Each	4.00
AUC1358	Screw, Throttle Disc	Each	4.00

SUB-ASSEMBLY - HT : HT Lead Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
HY7	Lead Suppressor	Each	5.00
IT111	Terminal, H.T.	Each	8.00
H121	Terminal, H.T.	Each	6.00
RS218	Boot, Rubber, H.T.	Each	8.00
RS76	Boot, Rubber, H.T.	Each	6.00

SUB-ASSEMBLY - CWP + B : Jockey Pulley & Bracket Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C18732	Bracket, Jockey Pulley	Each	1.00
C18447M	Spring, Torsion	Each	1.00
BJJPS	Spacer, Jockey Pulley	Each	1.00
C19521	Pulley, Jockey	Each	1.00

SUB-ASSEMBLY - C18613L : RH Caliper Assembly - Self Adjusting

Component Part Number	Component Description	Unit Meas.	Quantity Required
8009	Caliper, Rear, RH	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
8816	Cylinder	Each	2.00
8829	Carrier	Each	1.00
8831	Carrier	Each	1.00
8834	Lever	Each	1.00
8835	Spring	Each	1.00
8837	Spring	Each	1.00
8840	Spring	Each	1.00
8980	Nut, Adjusting	Each	1.00
8842	Cover	Each	1.00
8843	Cover	Each	1.00
8846	Plate	Each	1.00
8014	Washer	Each	1.00
JG037	Bolt	Each	2.00
JG186Y	Bolt	Each	1.00
DB707	Set, Pad	Each	1.00
7783RH	Pipe, Crossover	Each	1.00
8836	Pawl	Each	1.00

SUB-ASSEMBLY - C18614L : LH Caliper Assembly - Self Adjusting

Component Part Number	Component Description	Unit Meas.	Quantity Required
8010	Caliper, Rear, LH	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
8816	Cylinder	Each	2.00
8830	Carrier	Each	1.00
8831	Carrier	Each	1.00
8834	Lever	Each	1.00
8835	Spring	Each	1.00
8837	Spring	Each	1.00
8840	Spring	Each	1.00
8980	Nut, Adjusting	Each	1.00
8842	Cover	Each	1.00
8843	Cover	Each	1.00
8846	Plate	Each	1.00
8014	Washer	Each	1.00
JG037	Bolt	Each	2.00
JG186Y	Bolt	Each	1.00
DB707	Set, Pad	Each	1.00
7783LH	Pipe, Crossover	Each	1.00
8836	Pawl	Each	1.00

SUB-ASSEMBLY - C16348E : RH Early Caliper Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
8009	Caliper, Rear, RH	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
7783RH	Pipe, Crossover	Each	1.00
8816	Cylinder	Each	2.00
8011	Carrier, Pad	Each	1.00
8831	Carrier, Pad	Each	1.00
8013	Lever, Operating	Each	1.00
JG138Y	Bolt, Lever	Each	1.00
8846	Plate, Retraction	Each	1.00
JG037	Bolt, Handbrake	Each	2.00
8014	Washer, Lock Tab	Each	1.00
DB707	Set, Handbrake Pad	Each	1.00

SUB-ASSEMBLY - C16349E : LH Early Caliper Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
8010	Caliper, Rear, LH	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
7783LH	Pipe, Crossover	Each	1.00
8816	Cylinder	Each	2.00
8012	Carrier, Pad	Each	1.00
8831	Carrier, Pad	Each	1.00
8013	Lever, Operating	Each	1.00
JG138Y	Bolt, Lever	Each	1.00
8846	Plate, Retraction	Each	1.00
JG037	Bolt, Handbrake	Each	2.00
8014	Washer, Lock Tab	Each	1.00
DB707	Set, Handbrake Pad	Each	1.00

SUB-ASSEMBLY - C15648 : Caliper Assembly RH Front

Component Part Number	Component Description	Unit Meas.	Quantity Required
7715	Caliper, Brake Front	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
8777	Cylinder, Wheel	Each	2.00
7783RH	Pipe, Crossover	Each	1.00

SUB-ASSEMBLY - C15649 : Caliper Assembly LH Front

Component Part Number	Component Description	Unit Meas.	Quantity Required
7715	Caliper, Brake Front	Each	1.00
7718	Plate, Pad Support	Each	2.00
7719	Retainer, Brake Pad	Each	1.00
JG064Z	Screw, Bleed	Each	1.00
3/16BALL	Ball, Bleed Screw	Each	1.00
8777	Cylinder, Wheel	Each	2.00
7783LH	Pipe, Crossover	Each	1.00

SUB-ASSEMBLY - AUC992SUB : Carburettors

Component Part Number	Component Description	Unit Meas.	Quantity Required
AUC4387	Spring, Piston	Each	2.00
AUC8221	Housing, Jet	Each	2.00
AUC1323	Adaptor, Auto Ignition	Each	1.00
WZX1303	Float,	Each	2.00
AUC2411	Rod, Throttle Connecting	Each	1.00
AUC2027	Spring, Valve, Slow Running	Each	2.00
AUC1041	Spring, Needle, Choke	Each	1.00
AUC2028	Valve, Slow Running	Each	2.00
AJD8014Z	Nut, Bolt Coupling	Each	4.00
AUC2006	Spring, Jet Return	Each	2.00
AUC2086	Bolt, Casting to Float Chamber	Each	1.00
AUC2087	Casting, Pipe	Each	1.00
AUC2085	Bracket, Thermobody	Each	1.00
AUC2088	Bowl, Float Front	Each	1.00
AUC2009	Bowl, Float Rear	Each	1.00
AUC2175	Screw, Chamber to Body	Each	8.00
AUC2451	Spring, Screw	Each	2.00
AUC2521	Screw, Stop, Adjusting	Each	2.00
AUC2669	Bolt, Coupling	Each	4.00
AUC4334	Coupling, Rod	Each	2.00
AUC4612	Washer, Bolt, Coupling	Each	4.00
AUC4759	Jet, Choke	Each	1.00
AUC2698	Bolt, Banjo	Each	3.00
AUC8060	Chamber and Piston Assembly	Each	2.00
AUC8102	Damper, Piston	Each	2.00
AUC8129	Needle, Choke	Each	1.00
AUC8961	Housing, Choke	Each	1.00
AUD9490	Solenoid, Choke	Each	1.00
AUE254	Lid, Float Bowl	Each	1.00
AUE255	Lid, Float Bowl	Each	1.00
WZX1284	Kit, Shield, Choke	Each	1.00
113-6306	Kit, Carb. Repair	Each	2.00
112866	Block, Insulator Carb.	Each	4.00
AUC2139	Filter, Gauze, Lid	Each	2.00
C1	Needle,	Each	2.00
AUC2110	Bolt, Float Bowl Fixing	Each	8.00
C18065	Bracket, Assembly Carb.	Each	1.00
C14371	Lever, Carb. Return Spring	Each	1.00
AJD1042	Bolt, Lever	Each	1.00
AUC3200	Pipe, Carb. Overflow	Each	2.00
C20795	Pipe, Carb. Feed	Each	1.00
7088/9	Recon. Carb. Base Sub-Assembly	Each	2.00
C14492	Hose, Fuel, Feed Pipe to Filter	Each	1.00
GA27001	Hose, Gates, Carb. Overflow	Each	1.00
AUC1867	Nut, Cap	Each	2.00

SUB-ASSEMBLY - SCRHA : Steering Column RHD Auto

Component Part Number	Component Description	Unit Meas.	Quantity Required
C20923	Tube, S/Column, Outer, RHD	Each	1.00
C16817	Tube, S/Column, Inner	Each	1.00
SCBB	Bracket, S/Column, Bottom	Each	1.00
C23762	Horseshoe, S/Column	Each	1.00
C23592	Bush, S/Column, Lower	Each	1.00
C23593	Bush, S/Column, Upper	Each	1.00
C15419	Nut, Lock, S/Column, Large	Each	1.00
C7879	Nut, Lock, S/Column, Small	Each	1.00
C13638	Collet, Split, S/Column	Each	1.00
C7878	Cone, Split, C/Column - 2 pieces	Each	2.00
C16150	Binnacle	Each	1.00
C15690	Binnacle, Lower, S/Column	Each	1.00
C16525	Gate, Gear Selector, S/Column	Each	1.00

SUB-ASSEMBLY - SCRHM : Steering Column RHD Manual

Component Part Number	Component Description	Unit Meas.	Quantity Required
C22644	Tube, S/Column, Outer, RHD	Each	1.00
C16817	Tube, S/Column, Inner	Each	1.00
SCBB	Bracket, S/Column, Bottom	Each	1.00
C23762	Horseshoe, S/Column	Each	1.00
C23592	Bush, S/Column, Lower	Each	1.00
C23593	Bush, S/Column, Upper	Each	1.00
C15419	Nut, Lock, S/Column, Large	Each	1.00
C7878	Cone, Split, C/Column - 2 pieces	Each	2.00
C15682	Binnacle	Each	1.00
C15690	Binnacle, Lower, S/Column	Each	1.00
C7879	Nut, Lock, S/Column, Small	Each	1.00

SUB-ASSEMBLY - SCLHA : Steering Column LHD Auto

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16671	Tube, S/Column, Outer, LHD	Each	1.00
C16817	Tube, S/Column, Inner	Each	1.00
C23762	Horseshoe, S/Column	Each	1.00
C23592	Bush, S/Column, Lower	Each	1.00
C23593	Bush, S/Column, Upper	Each	1.00
C15419	Nut, Lock, S/Column, Large	Each	1.00
C7879	Nut, Lock, S/Column, Small	Each	1.00
C13638	Collet, Split, S/Column	Each	1.00
C7878	Cone, Split, C/Column - 2 pieces	Each	2.00
C16150	Binnacle	Each	1.00
C15690	Binnacle, Lower, S/Column	Each	1.00
C16525	Gate, Gear Selector, S/Column	Each	1.00

SUB-ASSEMBLY - SCLHM : Steering Column LHD Manual

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16676	Tube, S/Column, Outer, LHD	Each	1.00
C16817	Tube, S/Column, Inner	Each	1.00
C23762	Horseshoe, S/Column	Each	1.00
C23592	Bush, S/Column, Lower	Each	1.00
C23593	Bush, S/Column, Upper	Each	1.00
C15419	Nut, Lock, S/Column, Large	Each	1.00
C7879	Nut, Lock, S/Column, Small	Each	1.00
C13638	Collet, Split, S/Column	Each	1.00
C7878	Cone, Split, C/Column - 2 pieces	Each	2.00
C15682	Binnacle	Each	1.00
C15690	Binnacle, Lower, S/Column	Each	1.00

SUB-ASSEMBLY - BJDLS : Door Latch Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
BD19580	Latch, Door, Front, Left	Each	1.00
BD19581	Latch, Door, Front, Right	Each	1.00
BD19582	Latch, Door, Rear, Left	Each	1.00
BD19583	Latch, Door, Rear, Right	Each	1.00
30039K	Screw, Door Latch Cover	Each	4.00
RHLS	Spring, Latch, RH	Each	1.00
LHLS	Spring, Latch, LH	Each	1.00
STAR	Star, Latch	Each	4.00
BJDLF	Ferrule, Door Latch	Each	4.00
DLCLH	Cover, Door Latch, LH	Each	2.00
DLCRH	Cover, Door Latch, RH	Each	2.00

SUB-ASSEMBLY - LOCKSET : Car Lock Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
C15454	Switch, Ignition	Each	1.00
BD9888	Lock, Boot	Each	1.00
BD5300	Lock, Glovebox	Each	1.00
8186	Barrel, Door Lock	Each	1.00
818793	Barrel, Door Lock	Each	1.00
8190RH	Barrel, Door Lock	Each	1.00
8190LH	Barrel, Door Lock	Each	1.00

SUB-ASSEMBLY - AIRCONHOSE : Air Conditioning Hose Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
FH0326	Hose, No. 8	cm.	60.00
FH0322	Hose, No. 6	cm.	473.00
FH0332	Hose, No.10	cm.	383.00
AF1121	Flare, Female, No. 6 x 90	Each	3.00
AF1122	Flare, Female, No. 8 x 90	Each	2.00
AF1123	Flare, Female, No.10 x 90	Each	2.00
AF1303	O-Ring, Female, No.10 x ST	Each	2.00
AF1933F	Flare, Female, No. 6 Horseshoe	Each	1.00
AF3006	Sleeve, No. 6	Each	4.00
AF3008	Sleeve, No. 8	Each	2.00
AF3010	Sleeve, No.10	Each	4.00
AF2658	Elbow, 90 Swivel, No. 8 M/F	Each	1.00
AF2660	Elbow, 90 Swivel, No.10 M/F	EAch	2.00

ASSY01 : Door Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
BD10732	Spring, Interior Door Handle	Each	8.00
BD10733	Pin, Retaining, Door Handle	Each	8.00
KJG977	Kit, Door Cap, Screws + Washers	Each	1.00
BD17301	Bracket	Each	2.00
JG108K	Screw, Quarter Light	Each	10.00
JG107K	Screw, Quarter Light	Each	12.00
JG160K	Screw	Each	4.00
1/4x1CS	Screw, Allen, UNF, Striker Plate	Each	12.00
3/16x3/4CS	Screw, Door Catch, Picnic Tray	Each	16.00
BJDLS	Set, Door Latch	Each	1.00
7024	Pin, Check Arm, Door	Each	4.00
JG008Z	Bolt, Hing, Door	Each	18.00
GB099Z	Bolt, Hinge	Each	8.00
BD17048/9	Rubber, Quarter Light, Front	Each	1.00
BD17072/3	Rubber, Quarter Light, Rear	Each	2.00
BD19578	Remote, Door Lock, LHR	Each	1.00
BD19579	Remote, Door Lock, RHR	Each	1.00
BD19576	Remote, Door Lock, Front	Each	2.00
ARSH	Holder, Anti Rattle Strip	Each	4.00
LOCKSET	Set, Car Lock	Each	1.00
AS1528	Channel, Window	Each	3.00
SDP	Deadener, Sound	Sheet	5.00
8167	Check Arm, Door, Front	Each	2.00
5141	Check Arm, Door, Rear	Each	2.00
SP	Runner, Striker Plate, Chrome	Each	4.00
BD17808	Striker Plate, Door Lock, LH	Each	2.00
BD17809	Striker Plate, Door Lock, RH	Each	2.00
BD10728	Handle, Window Winder, Chrome	Each	4.00
BD10729	Handle, Door, Interior, Chrome	Each	4.00
BD10731	Washer, Stepped, Door Handle	Each	8.00
BD10730	Washer, Tapered, Door Handle	Each	8.00
2/0446/A1	Handle, Door, Exterior, New, LH	Each	2.00
2/0447/A2	Handle, Door, Exterior, New, RH	Each	2.00
BD20086	Catch, Quarter Light, Chrome, LH	Each	1.00
BD20087	Catch, Quarter Light, Chrome, RH	Each	1.00
BD17305	Finisher, Quarter Catch, Rear, LH	Each	1.00
BD17306	Finisher, Quarter Catch, Rear, RH	Each	1.00
BD17111	Catch, Quarter Light, Front, RH	Each	1.00
BD17112	Catch, Quarter Light, Front, LH	Each	1.00
DOORRS	Set, Rubber, Door	Each	1.00
BD18298	Regulator, Window, R/L	Each	1.00
BD18299	Regulator, Window, R/R	Each	1.00
BD18297	Regulator, Window, F/R	Each	1.00
BD18296	Regulator, Window, F/L	Each	1.00
BD17060	Channel, Regulator, Rear, LH	Each	1.00
BD17061	Channel, Regulator, Rear, RH	Each	1.00
BD17059	Channel, Regulator, Front	Each	2.00
294	Glass, Side, Front, Late	Each	2.00
295	Glass, Side, Rear, Late	Each	2.00

ASSY01 - cont'd : Door Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
BD17089	Glass, Quarter Light, B-Type, Rear	Each	2.00
BD17068	Glass, Quarter Light, A-Type, Front	Each	2.00
LHLF	Frame, Door, Late, Front, LH	Each	1.00
RHLF	Frame, Door, Late, Chrome, RH	Each	1.00
LHREARL	Frame, Door, Late, Rear, LH	Each	1.00
RHREARL	Frame, Door, Late, Rear, RH	Each	1.00

ASSY02 : Plugs, Washers, Wipers, Clips

Component Part Number	Component Description	Unit Meas.	Quantity Required
10MM	Clip, Hose, 10mm	Each	6.00
12MM	Clip, Hose, 12mm	Each	14.00
14MM	Clip, Hose, 14mm	Each	12.00
MH4	Clip, Hose, Choke	Each	11.00
M00	Clip, Hose, 11-15mm	Each	2.00
ASS8	Clip, Hose, Stainless, 11-25mm	Each	2.00
OX	Clip, Hose, 18-25mm	Each	20.00
JG091PF	Jet Assembly, Window Washer	Each	2.00
C14405	Wiper Wheel Box Assembly	Each	1.00
8799	Tube, Wiper	Each	1.00
C13503	Motor, Wiper	Each	1.00
8183	Blade, Wiper	Each	2.00
8697	Arm, Wiper	Each	2.00
3/16TUBE	Tube, Clear, Window Washer	cm.	100.00
EW4T	Kit, Washer	Each	1.00
R130-8	Button, Door, Anti-Rattle	Each	4.00
R305/2	Plug, Rubber, No. 2	Each	24.00
R305/3	Plug, Rubber, No. 3	Each	6.00
R305/4	Plug, Rubber, No. 4	Each	10.00
R305/6	Plug, Rubber, No. 6	Each	10.00
R305/7	Plug, Rubber, No. 7	Each	4.00
R305/8	Plug, Rubber, No. 8	Each	4.00
R305/9	Plug, Rubber, No. 9	Each	2.00
R305/10	Plug, Rubber, No. 10	Each	2.00
R305/11	Plug, Rubber, No. 11	Each	3.00
R314/3	Grommet, Rubber, No. 3	Each	10.00
R314/5	Grommet, Rubber, No. 5	Each	5.00
R314/6	Grommet, Rubber, No. 6	Each	10.00
R314/11A	Grommet, Rubber, No. 11A	Each	10.00
R314/12	Grommet, Rubber, No. 12	Each	10.00
R314/14	Grommet, Rubber, No. 14	Each	2.00
R314/18	Grommet, Rubber, No. 18	Each	2.00
CWK3008	Set, Escutcheon, Wiper	Each	2.00

ASSY03 : RHD Brake Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13706	Pipe, Brake, Master Cylinder to Servo	Each	1.00
C17594	Pipe, Brake, Master Cylinder to Res.	Each	1.00
C12100	Pipe, Brake, Adaptor to LH Front	Each	1.00
C13708	Pipe, Brake, Adaptor to Servo	Each	1.00
C13709	Pipe, Brake, Adaptor to RH Front	Each	1.00
C23688	Reservoir, Brake Fluid	Each	1.00
C23631	Switch, Brake Reservoir	Each	1.00
C5173	Clip, Brake Fluid Reservoir	Each	1.00
3/8PUSHLOK	Hose, Brake, Servo, Vacuum	cm.	45.00
C11008	Union, Brake Pipe, 4 Way	Each	1.00
32-208	Switch, Stop Light	Each	1.00
P4285	Nut, Tube, Brake Pipe	Each	5.00
60-6	Pin, Clevis, Brake	Each	2.00
4258-230	Servo Assembly	Each	1.00
BD29992	Housing, Servo	Each	1.00
C8971	Cover, Plate, Housing, Master Cylinder	Each	1.00

ASSY03A : LHD Brake Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16345	Pipe, Brake, Master Cylinder to Servo	Each	1.00
C12100	Pipe, Brake, Adaptor to LH Front	Each	1.00
C13708	Pipe, Brake, Adaptor to Servo	Each	1.00
C13709	Pipe, Brake, Adaptor to RH Front	Each	1.00
C23688	Reservoir, Brake Fluid	Each	1.00
C23631	Switch, Brake Reservoir	Each	1.00
C5173	Clip, Brake Fluid Reservoir	Each	1.00
3/8PUSHLOK	Hose, Brake, Servo, Vacuum	cm.	45.00
C11008	Union, Brake Pipe, 4 Way	Each	1.00
32-208	Switch, Stop Light	Each	1.00
P4285	Nut, Tube, Brake Pipe	Each	5.00
60-6	Pin, Clevis, Brake	Each	2.00
4258-230	Servo Assembly	Each	1.00
BD29992	Housing, Servo	Each	1.00

ASSY04 : Fuel Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C3053	Mount, Rubber, Fuel Tank	Each	6.00
7950001	Filter, Fuel, AC	Each	1.00
GF124	Element, Fuel Filter, AC	Each	1.00
C22273	Spring	Each	1.00
FF3022	Filter	Each	1.00
MGLC15	Cap, Locking, Fuel Tank	Each	1.00
BD9898	Neck, Rubber, Fuel Filter	Each	1.00
C13705	Bolt, Banjo, Fuel Filter	Each	1.00
60x5	Fitting, Fuel Pipe	Each	1.00
105x5	Union, Fuel Pipe	Each	1.00
EP10	Pump, Fuel	Each	1.00
4.75BS	Tube, Bundy, Used for Brakes	cm.	800.00
7.95BS	Tube, Steel, Main Fuel	cm.	800.00
4219G	Line, 5/16", Fuel	cm.	140.00
C17565ASSY	Tank, Fuel	Each	1.00
R314/8	Grommet, Rubber, No. 8	Each	1.00
GA27001	Tube, Fuel, 3/16"	cm.	30.00

ASSY05 : Exterior First Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C4794	Mount, Engine and Bumper	Each	4.00
BAC5298	Clip, Chrome to Body	Each	33.00
BD26706/1	Rivet	Each	100.00
CWK107	Aerial	Each	1.00
210	Hammer, Thor, Boot of Car	Each	1.00
BD10221	Cable, Bonnet Release	Each	1.00
6730	Hook, Safety, Bonnet	Each	1.00
780	Spring, Bonnet, Safety Hook	Each	1.00
BD12860	Pin, Bonnet, Safety Hook	Each	1.00
BD18303	Base and Lever, Bonnet	Each	1.00
BD12853	Catch Plate and Spring, Bonnet	Each	1.00
BD12852	Plate, Striker, Bonnet, Chrome	Each	1.00
BD12842	Peg + Spring + Washer, Bonnet	Each	1.00
KJG987	Kit, Bumper, Fitting	Each	1.00
BD9925	Bracket, Bumper	Each	2.00
BD10995	Bracket, Angled, Bumper Iron	Each	2.00
BD17291	Insert, Windscreen	Each	1.00
BD6581	Plug, Rubber, Number Plate	Each	4.00
BD4321	Buffer, Fuel Lid	Each	8.00
BD17847/1	Seal, Spat	Pair	1.00
BD9876	Rubber, Air Vent, Front	Each	1.00
BD14100/S	Seal, Boot Lid	Each	1.00
BD14607	Elbow, Demister	Each	2.00
BD17163	Nozzle, Demister, RH	Each	1.00
BD17164	Nozzle, Demister, LH	Each	1.00
DBB	Bracket, Air Distribution Box	Each	1.00
BD11007	Clamp, Spare Wheel	Each	1.00
BD17176	Iron, Bumper, RH	Each	1.00
BD17177	Iron, Bumper, LH	Each	1.00
BD10996	Iron, Bumper, Outer, LH	Each	1.00
BD10997	Iron, Bumper, Outer, RH	Each	1.00
BD29575	Windscreen	Each	1.00
BD26888	Seal, Rubber, Windscreen	Each	1.00
BD16991HP	Screen, Rear, Heated	Each	1.00
BD16992	Seal, Rubber, Screen, Rear	Each	1.00
BD14508	Hose, Demister, LH	Each	1.00
BD14507	Hose, Demister, RH	Each	1.00
BD18650	Box, Air Distribution	Each	1.00
BD16909	Chrome, Windscreen, LH	Each	1.00
BD16910	Chrome, Windscreen, RH	Each	1.00
BD16993	Chrome, Screen, Rear, LH	Each	1.00
BD16994	Chrome, Screen, Rear, RH	Each	1.00
BD10954	Mascot	Each	1.00
14/0087	Spear, Head Lamp, New	Each	2.00
BD17139	Piece, Gutter Joint, Chrome	Each	2.00
BD5366	Joint, Windscreen, Chrome	Each	4.00
BD17090	Trim, B/C Post, Brass	Each	2.00
14/0204	Trim, B/C Post, Threaded, New	Each	2.00
3/0282	Escutcheon, Boot Lock, New	Each	1.00
BD17626	Finisher, A-Post, Chrome, LH	Each	1.00
BD17627	Finisher, A-Post, Chrome, RH	Each	1.00
BD16752	Post, B/C, Chrome	Each	2.00
CBMS	Kit, Body Moulding, Chrome	Each	1.00

ASSY06 : Mechanical First Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
R4040	Shock Absorber, Rear	Each	2.00
C10791ASSY	Spring Assembly, Rear	Pair	1.00
EXSH	Kit, Shield, Exhaust	Each	1.00
C12343	Mount, Rear Axle, Front Spring	Each	2.00
C10845	Mount, Rear Axle, Centre Spring	Each	2.00
HPSET	Set, Heater Pipe, 2 Pipes	Each	1.00
C12391	Blade, Fan	Each	1.00
GB084Z	Bolt, Driveshaft	Each	8.00
AFREEZE	Antifreeze	4-Ltr	1.00
C11528	Support, Mount, Engine	Each	1.00
C11529	Support, Mount, Engine	Each	1.00
22x12x6	Spacer	Each	8.00
3/8NT	Tubing	cm.	10.00

ASSY07 : Air-Conditioner

Component Part Number	Component Description	Unit Meas.	Quantity Required
SP4047	Vent, Air Conditioner	Each	1.00
BJCMB	Bracket, Condenser, Air Conditioner	Each	1.00
BJACG	Grille, Air Conditioner	Each	1.00
BJCS/2	Shroud, Condenser	Each	1.00
AIRCONKIT	Kit, Air Conditioner	Each	1.00
AIRCONBOX	Box, Air Conditioner	Each	1.00
AIRCONHOSE	Hose, Air Conditioner	Set	1.00
BJFDG	Guard, Filter Dyer	Each	1.00
SP7045	Vent, Air Conditioner - Small	Each	1.00
CAC7912	Cooler, Fuel	Each	1.00
NPS	Seal	Each	2.00
23836	Hose, Gates, Duct	Each	1.00

ASSY08 : Exterior Second Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
CPLATE	Chassis Plate	Each	1.00
JG003PF	Bolt, Bumper, Chrome	Each	2.00
BD10224	Buffer, Rubber, Bonnet	Each	2.00
C4928	Rubber, Jack Point	Each	4.00
BD9949/1	Seal, Bumper, Rear	Each	1.00
BD9868/1	Seal, Override	cm.	120.00
C14802	Wheel, Chrome	Each	5.00
K058	Spinner, Wheel, Chrome, LH	Each	2.00
K059	Spinner, Wheel, Chrome, RH	Each	2.00
4/0454	Vane, Centre, Grille, Radiator	Each	1.00
BD17149	Grille, Radiator	Each	1.00
BD17172	Bumper, Front	Each	1.00
BD10985	Override, Front	Each	2.00
BD17185	Override, Rear, LH	Each	1.00
BD17186	Override, Rear, RH	Each	1.00
BD18080	Finisher, Rear Bumper, LH	Each	1.00
BD18081	Finisher, Rear Bumper, RH	Each	1.00
BD17180	Bumper, Rear	Each	1.00
JG024Y	Washer	Each	2.00

ASSY11 : Accelerator (Short Pedal)

Component Part Number	Component Description	Unit Meas.	Quantity Required
C10940/1	Bush, Accelerator Shaft	Each	1.00
C8969	Pad, Rubber, Pedal, Short	Each	1.00
C16284	Shaft, Accelerator, Short Pedal	Each	1.00
C16282	Pad, Accelerator, Short	Each	1.00
C13536	Lever, Carb. (Pedal Shaft)	Each	1.00

RHDABPASSY : RHD Auto Brake Pedal Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13695	Housing, Brake/Clutch Pedal	Each	1.00
C8958	Shaft, Pedal Housing	Each	1.00
C13514	Pedal, Brake, Auto, RHD	Each	1.00
C6876	Rubber, Brake Pad, Auto	Each	1.00
C8966	Spring, Clutch Pedal	Each	1.00
C13066	Pad, Brake, Auto	Each	1.00
64068590	Cylinder, Master, Brake	Each	1.00
60-6	Pin, Clevis	Each	1.00
P6125	Boot, Master Cylinder	Each	1.00

LHDABPASSY : LHD Auto Brake Pedal Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13695	Housing, Brake/Clutch Pedal	Each	1.00
C8958	Shaft, Pedal Housing	Each	1.00
C13249	Pedal, Brake, LH	Each	1.00
C6876	Rubber, Brake Pad, Auto	Each	1.00
C8966	Spring, Clutch Pedal	Each	1.00
C13066	Pad, Brake, Auto	Each	1.00
64068590	Cylinder, Master, Brake	Each	1.00
60-6	Pin, Clevis	Each	1.00
P6125	Boot, Master Cylinder	Each	1.00

RHDMBPASSY : RHD Manual Brake and Clutch Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13695	Housing, Brake/Clutch Pedal	Each	1.00
C8958	Shaft, Pedal Housing	Each	1.00
C13246	Pedal, Clutch, RH	Each	1.00
C13247	Pedal, Brake, Manual, RH	Each	1.00
C8963	Spring, Brake Pedal	Each	1.00
C8966	Spring, Clutch Pedal	Each	1.00
C8969	Pad, Rubber, Pedal, Short	Each	2.00
C14852	Pad, Pedal, Steel, Short	Each	2.00
64068590	Cylinder, Master, Brake	Each	1.00
C20526	Cylinder, Master, Clutch	Each	1.00
60-6	Pin, Clevis	Each	2.00
P4	Nut, Tube	Each	1.00
P6125	Boot, Master Cylinder	Each	1.00

LHDMBPASSY : LHD Manual Brake and Clutch Assembly

Component Part Number	Component Description	Unit Meas.	Quantity Required
C13695	Housing, Brake/Clutch Pedal	Each	1.00
C8958	Shaft, Pedal Housing	Each	1.00
C13248	Pedal, Clutch, RH	Each	1.00
C13249	Pedal, Brake, Manual, RH	Each	1.00
C8963	Spring, Brake Pedal	Each	1.00
C8966	Spring, Clutch Pedal	Each	1.00
C8969	Pad, Rubber, Pedal, Short	Each	2.00
C14852	Pad, Pedal, Steel, Short	Each	2.00
64068590	Cylinder, Master, Brake	Each	1.00
C20526	Cylinder, Master, Clutch	Each	1.00
60-6	Pin, Clevis	Each	2.00
P4	Nut, Tube	Each	1.00
P6125	Boot, Master Cylinder	Each	1.00

C15501ASSY : RHD Hand Brake

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16180	Bracket, Switch, Hand Brake	Each	1.00
C16185	Bracket, Switch Op., Hand Brake, RHD	Each	1.00
C12833	Switch, Hand Brake	Each	1.00
C15501	Lever, Hand Brake, Chrome	Each	1.00
C15511	Lever	Each	1.00
C8990	Housing	Each	1.00
C15503	Shaft	Each	1.00

C15502ASSY : LHD Hand Brake

Component Part Number	Component Description	Unit Meas.	Quantity Required
C16180	Bracket, Switch, Hand Brake	Each	1.00
C16188	Bracket, Switch Op., Hand Brake, LHD	Each	1.00
C12833	Switch, Hand Brake	Each	1.00
C15501	Lever, Hand Brake, Chrome	Each	1.00
C15511	Lever	Each	1.00
C8990	Housing	Each	1.00
C15503	Shaft	Each	1.00

ASSY18 : RHD Wood Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
WOOD-R	Wood Set, Right Hand Drive	Set	1.00
JG154K	Screw, Hinge, Glove Box	Each	4.00
BD17776	Finisher, Cantrail, Chrome	Each	2.00

ASSY19 : LHD Wood Set

Component Part Number	Component Description	Unit Meas.	Quantity Required
WOOD-L	Wood Set, Left Hand Drive	Set	1.00
JG154K	Screw, Hinge, Glove Box	Each	4.00
BD17776	Finisher, Cantrail, Chrome	Each	2.00

ASSY20 : RH Auto Mechanical Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C25943	Mount, Auto Transmission, Rear	Each	1.00
C16727	Bracket, Auto Cable Transfer	Each	1.00
C16725	Lever, Auto Cable Transfer	Each	1.00
C16810	Link, Auto Cable Transfer	Each	1.00
C22361	Cover, Automatic Transmission	Each	1.00
RHDAC	Cable, Auto Select, RHD	Each	1.00
ATF210	Fluid, Auto Transmission	Litre	11.00
1310	Driveshaft	Each	1.00
CBC2517	Seat, Rubber	Each	1.00
C24217	Spring	Each	1.00
C12265	Bush	Each	1.00
0555-334373	Cooler, Transmission	Each	1.00
BJATCG	Guard, Cooler, Transmission	Each	1.00
49450	Hose, Cooler, Transmission	cm.	110.00

ASSY21 : LH Auto Mechanical Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
C25943	Mount, Auto Transmission, Rear	Each	1.00
C22361	Cover, Automatic Transmission	Each	1.00
LHDAC	Cable, Auto Select, LHD	Each	1.00
ATF210	Fluid, Auto Transmission	Litre	11.00
1310	Driveshaft	Each	1.00
CBC2517	Seat, Rubber	Each	1.00
C24217	Spring	Each	1.00
C12265	Bush	Each	1.00
0555-334373	Cooler, Transmission	Each	1.00
BJATCG	Guard, Cooler, Transmission	Each	1.00
49450	Hose, Cooler, Transmission	cm.	110.00

ASSY22 : Trim Components

Component Part Number	Component Description	Unit Meas.	Quantity Required
19x12x6	Spacer	Each	8.00
C15593/4	Plate, Dash Heater Hot/Cold	Pair	1.00
AL160	Speakers	Pair	1.00
AL100	Speakers	Pair	1.00
500-45	Belt, Seat, Front, 3 point	Each	2.00
210SB	Belt, Seat, Rear	Each	2.00
30078K	Screw	Each	6.00
3/16x3/4CS	Screw, Door Catch, Picnic Tray	Each	8.00
3/16x3/8CS	Screw, Hing, Picnic Tray	Each	11.00
BD17254	Slide, Plain, LH	Each	1.00
BD17256	Slide, Locking, LH	Each	1.00
BD17255	Slide, Plain, RH	Each	1.00
BD17257	Slide, Locking, RH	Each	1.00
BD17536	Panel, Radio	Each	1.00
BJTC	Cover Transmission	Each	1.00
BJFSS	Support, Seat, Front	Each	4.00
C16407	Mirror, Rear View	Each	1.00
BD17565	Ash Tray, Console	Each	1.00
BD24165	Pivot + Base, Sunvisor, Chrome	Each	2.00
C15592	Escutcheon, Heater	Each	2.00
BD17567	Grille, Speaker, Chrome	Each	1.00
BD17547	Knob, Centre Console, Chrome	Each	1.00
BD17589	Knob, Radio Panel, Chrome	Each	2.00
BD24266	Hinge, Picnic Tray, Chrome	Each	4.00
BD17640	Handle, Picnic Tray	Each	2.00
BD17022	Box, Distribution, Rear, Console	Each	1.00
RSSKP	Plate, Kick, Rear	Each	2.00
FSSKP	Plate, Kick, Front	Each	2.00
15"	Wheel, Steering, Motolita	Each	1.00
JG154K	Screw, Hinge, Glove Box	Each	12.00

ASSY23 : Power Steering Components RHD

Component Part Number	Component Description	Unit Meas.	Quantity Required
PSHOSERH	Set, Hose, Power Steering	Each	1.00
C10186	Steady Bar, Battery	Each	1.00
MB501240	Reservoir, Power Steering	Each	1.00

ASSY24 : Power Steering Components LHD

Component Part Number	Component Description	Unit Meas.	Quantity Required
PSHOSELH	Set, Hose, Power Steering	Each	1.00
C10186	Steady Bar, Battery	Each	1.00
MB501240	Reservoir, Power Steering	Each	1.00

ASSY25 : Badge Kit - 3.8 Auto

Component Part Number	Component Description	Unit Meas.	Quantity Required
JG160K	Screw	Each	2.00
BD17736	Badge, Radiator Grille, 3.8	Each	1.00
BD17737	Badge, Disc Brake	Each	1.00
1/0136	Badge, Mk2	Each	1.00
1/0239	Badge, 3.8	Each	1.00
1/0277	Badge, Jaguar	Each	1.00
1/0493	Badge, Automatic	Each	1.00
BD17146	Retainer, Badge	Each	1.00
BD17150	Fixing Strip	Each	1.00

ASSY26 : Badge Kit - 3.8 Manual

Component Part Number	Component Description	Unit Meas.	Quantity Required
JG160K	Screw	Each	2.00
BD17736	Badge, Radiator Grille, 3.8	Each	1.00
BD17737	Badge, Disc Brake	Each	1.00
1/0136	Badge, Mk2	Each	1.00
1/0239	Badge, 3.8	Each	1.00
1/0277	Badge, Jaguar	Each	1.00
BD17146	Retainer, Badge	Each	1.00
BD17150	Fixing Strip	Each	1.00

ASSY27 : Badge Kit - 3.4 Auto

Component Part Number	Component Description	Unit Meas.	Quantity Required
JG160K	Screw	Each	2.00
BD12448	Badge, Radiator Grille, 3.4	Each	1.00
BD17737	Badge, Disc Brake	Each	1.00
1/0136	Badge, Mk2	Each	1.00
BD27196	Badge, 3.4	Each	1.00
1/0277	Badge, Jaguar	Each	1.00
1/0493	Badge, Automatic	Each	1.00
BD17146	Retainer, Badge	Each	1.00
BD17150	Fixing Strip	Each	1.00

ASSY28 : Badge Kit - 3.4 Manual

Component Part Number	Component Description	Unit Meas.	Quantity Required
JG160K	Screw	Each	2.00
BD12448	Badge, Radiator Grille, 3.4	Each	1.00
BD17737	Badge, Disc Brake	Each	1.00
1/0136	Badge, Mk2	Each	1.00
BD27196	Badge, 3.4	Each	1.00
1/0277	Badge, Jaguar	Each	1.00
BD17146	Retainer, Badge	Each	1.00
BD17150	Fixing Strip	Each	1.00

Bill of Material Deficit - Stock Order / Issue

Car No.

B.O.M. PART NUMBER	PART NUMBER	QTY.	ORDER No.	DESCRIPTION	RECEIVED
			SUPPLIER		ISSUED

NAME :

JOB COST ALLOCATION FOR W/E :

DAY Plus Start/ Finish Time	JOB NUMBER							TOTAL HOURS	<u>SIGNATURE</u>
							Unprod		
MONDAY Start..... Finish.....									
TUESDAY Start..... Finish.....									
WEDNESDAY Start..... Finish.....									
THURSDAY Start..... Finish.....									
FRIDAY Start..... Finish.....									
SATURDAY Start..... Finish.....									
SUNDAY Start..... Finish.....									
TOTAL HOURS PER JOB NUMBER									
TOTAL COST PER JOB NUMBER									

NOTE: Blank columns should be headed with car number, engine numbers, gearbox numbers, etc. The end column, marked "Unprod" is for any time spent on meetings, waiting for parts, etc.

JOB CARD

[illegible]

Quality Control

The quality forms do not conform to the type normally associated with ISO9000 etc. The reason for this is that everyone on the shop floor had the ability to stop production and send the product back to the previous department. Our quality objective was to be the best in the world in our particular field and everyone worked to this end. It was incomprehensible that any member of the staff would allow product to be worked on if it did not achieve the necessary standards. This was an attitude of mind. Management's motivational techniques were designed to uphold this approach.

Nowadays such an approach to quality may seem unscientific and without adequate control. Nothing could be further from the truth. Sophisticated, detailed, autocratic quality systems are simply a reflection on management's inability to operate freely and motivate the workforce in the manner they may wish. Managers are often hamstrung by regulatory restrictions and social attitudes. Working the way we did may not be easy, in fact it may be exceptionally difficult, but in the end it is the way that worked best.

Our systems, had we wished, could have been made to comply with ISO9000 but we had no need to work to such procedures when our motivational approach produced the required results. We had asked our staff to move from a jobbing operation to a systemised production operation and this was as much as we were prepared to ask of them. There is a limit to the amount of change that people can tolerate.

Panel Shop Check List

Vehicle Reference: Car.....

Page 1 of 2

TASK No.	TASK DESCRIPTION	NAME
1	Plate for Radiator Inlet made up	
2	Alternator modification welded	
3	Nut welded right top on fire wall	
4	Power Steering modification cut out	
5	Engine Mounts welded	
6	Front Suspension Mounts welded	
7	Chassis welded / no splits	
8	Front Brake Lining Holders welded	
9	Heater checked with water	
10	Vent Cover Hinges working	
11	Bulkhead welded	
12	Bumper threads checked / replaced (x 8)	
13	Stabiliser threads checked (x 4)	
14	Dash welded	
15	Under Dash - no cracks / plate welded	
16	Gearbox (Auto) hole cut	
17	Floor Clips removed	
18	Gearbox Studs welded	
19	Gearbox Cover Plate mounted	
20	Sill holes cut out for wiring	
21	Seat Belt Brackets mounted (x 10)	
22	Grease Nipples in Front / Rear Hinges	
23	Sun Visor holes checked	
24	Holes cut for Stereo and Air-conditioning unit pipes	

Panel Shop Check List

Vehicle Reference: Car.....

Page 2 of 2

TASK No.	TASK DESCRIPTION	NAME
25	Rear Parcel Shelf Seat Belt Mounts ground off	
26	Air-conditioning Duct welded and sealed	
27	Air-conditioning Box mounted and marked	
28	Air-conditioning Studs braced in	
29	Air-conditioning holes cut in Duct	
30	Jack Holder replaced	
31	Jack Bracket replacedd	
32	Bracket for Cover welded (x 2)	
33	Threads for Rear Bumper checked	
34	Brake Lining Holder at rear replaced	
35	Rear Spring Holder checked / replaced	
36	Grill fitted and marked	
37	Front Bumper fitted and beaten	
38	Rear Bumper fitted and beaten	
39	Window Frame fitted L.F.	
	R.F.	
	R.R.	
	L.R.	
40	Window Frame marked	
41	Door Gaps checked	
42	Boot Gap checked	
43	Bonnet Gap checked	
44	Spat Fitting checked	
45	Park Lights angle right	
46	Chassis Number right	

Panel Shop Check List

Vehicle Reference: Car.....

Page 1 of 2

HOLE SIZE	HOLES TO BE DRILLED	NAME
	<u>ENGINE BAY:</u>	
44 mm	4 x Radiator Cooler	
33 mm	2 x Air-conditioning Lines	
½ inch	2 x Horn	
	<u>FRONT GUARD:</u>	
	Park Light hole	
	<u>ROOF:</u>	
	Antenna hole	
	<u>FRONT DOORS:</u>	
¼ inch	4 x Under Doors	
3/16 inch	2 x Rear of Front Door	
5/16 inch	In front of Rear Top Trim hole	
13/32 inch	Door Pillar	
13/32 inch	Front of Front Door	
	<u>REAR DOORS:</u>	
¼ inch	3 x Under Doors	
3/16 inch	2 x Central Locking	
13/32 inch	Door Pillar	
13/32 inch	Front of Door	
	Hole for Central Locking (Plasma)	

Panel Shop Check List

Vehicle Reference: Car.....

Page 2 of 2

HOLE SIZE	HOLES TO BE DRILLED	NAME
1/2 inch	<u>BOOT:</u> Fuel Line	
6/8 inch	Fuel Line in Left Corner	
3/4 inch	Middle Big Hole - 7 inch up	
1/2 inch	2 nd Top Ridge 3.5 inch 1/2 inch	
3/6 inch	<u>WHEEL ARCH:</u> 3 x Around Wheel Arch	
1/4 inch	4 x For Rubber	

Assembly Check List

Vehicle Reference: Car.....

Page 1 of 2

BASIC BLOCK ASSEMBLY	PASS	FAIL	RECHECK OK
Record clearances - Big Eng Bearings			
- Main Bearings			
- Piston to Bore			
Cleanliness - Block, Frost Plug Holes, Head Stud Threads			
Fit and Seal Frost plugs and Gallery Plugs			
Fit Bearing Shells			
Fit Top half rear Main Seal and Housing (apply Sealer)			
Check crank Cleanliness and Fit			
Add Oil Groove Rear Main Bearing Cap			
Fit Caps and Thrust Washers, Torque 83FT LBD			
Check and Adjust Crank End Float - Record Clearance			
Fit and Seal Crank Gallery Plugs and Check Clearance			
Gap Rings and Fit			
Fit B.E. Shells			
Assemble Piston/Rods to Block and torque 37FT LBS			
Check Run Out of Dist Drive Shaft			
Assemble and Time Dist Drive Shaft (Loctite Nut)			
Fit Oil Pump Drive			
Prime Oil Pump and Fit. Lock Bolts			
Fit Pick Up Pipes (O-Rings and Gasket)			
Check Pick Up Pipe Alignment with Crank and Sump			
Fit Timing Gear Assembly and Chain Guides (Lock Bolts)			
Fit Tensioner and Release Tensioner Ratchet			
Fit Oil Slinger (check clearance)			
Fit Front Crank Seal to Timing Cover (apply Sealer)			

Assembly Check List

Vehicle Reference: Car.....

Page 2 of 2

BASIC BLOCK ASSEMBLY	PASS	FAIL	RECHECK OK
Assemble Cover to Engine and fit Crank Seal Sleeve			
Fit Pick Up Strainer (where applicable)			
Fit Sump (Seal Gaskets and Seals)			
Fit and Tighten Sump Plug			
Fit and Static Time Distributor			
Fit TDC Pointer to correct setting			
Check clearance jockey Pulley Nut to Damper			
Fit Flywheel and Torque (67LB FT) Lock Tabs			
Seal outside arch edge - Sump			

SIGNED BY :

AND :

Assembly Check List

Vehicle Reference: Car.....

Page 3 of 3

BASIC HEAD ASSEMBLY								PASS	FAIL	RECHECK OK
Check Cleanliness										
Assemble Valves and Studs, etc.										
Fit Cam Bearings										
Fit Camshaft Seal Rear Cap and Record Final Clearance										
Ex	1	2	3	4	5	6	(Front			
In	1	2	3	4	5	6				
Check Cam Cap Torque (15LB FT)										
Time Cams										
Fit Head Studs and Gaskets (Head Studs Level)										
Fit Head and Torque (54LB FT)										
Set Valve Timing and Adjust Chain Tension										
Lockwire Sprockets										
Tighten Tensioner Lock Nut										
Fit Manifold, Cam Covers, etc.										

SIGNED BY :

AND :

Assembly Check List

Vehicle Reference: Car.....

Page 4 of 4

MODEL 6 GEARBOX	PASS	FAIL	RECHECK OK
Check Front Pump Torque (22LB FT)			
Check Security Centre Bearing Carrier			
Check Valve Block and Servo Torque (100LBFT IN")			
Check Torque Tail Shaft Housings and Drive Flange			
Adjust Front Band			
Adjust Rear Band			
Secure pan			
Fit and Adjust Inhibitor Switch			
Fit and Secure Torque Converter Housing			

SIGNED BY :

AND :

MECHANICAL / ELECTRICAL CHECK - Car

Pre-Road Testing Finished Car – Page 2 of 2

DESCRIPTION	Pass	Fail	COMMENTS
Battery and Connections secure			
Electrical System check			
Electric Cooling Fan operation			
Steering Wheel secure			
Critical Bolts painted			
Ignition Timing - (record setting)			
Warrant of Fitness			

SIGNED BY:

AND:

FINAL INSPECTION - Car - Chassis No.

FINAL BODY – Page 1 of 1

DESCRIPTION	Pass	Fail	REASON
FRONT GUARD - Right			
FRONT GUARD - Left			
PARKING LIGHT - Left			
PARKING LIGHT - Right			
GRILL SURROUND & LIP FOR BUMPER			
ENGINE COMPARTMENT			
VENT & AREA UNDER WINDSCREEN			
ROOF			
RAIN CHANNEL - Left			
RAIN CHANNEL - Right			
REAR GUARD - Left			
REAR GUARD - Right			
REAR VALANCE			
BOOT INTERIOR			
SPAT - Left			
SPAT - Right			
SILLS			
INTERIOR			
DOOR - Front - left			
DOOR - Front - Right			
DOOR - Rear - Left			
DOOR - Rear - Right			
BONNET			
BOOTLID			

INSPECTED BY:

FINAL INSPECTION - Car - Chassis No.

FINAL INTERIOR — Page 1 of 1

DESCRIPTION	Pass	Fail	REASON
FRONT SEAT - Left			
FRONT SEAT - Right			
REAR BODY			
CARPETS - Front			
CARPETS - Rear			
INSTRUMENT PANEL			
GLOVE BOX PANEL			
WOODEN PANEL OVER DASHBOARD			
BOOT INTERIOR			
DOOR - Front - Left			
DOOR - Front - Right			
DOOR - Rear - Left			
DOOR - Rear - Right			
PARCEL SHELF & AIR-CONDITIONING			
WINDSCREEN & MIRROR			
DOOR RUBBERS			
BOOT RUBBERS			
DOOR LOCKING			
WINDOW WINDERS			
HEATER FAN			
AIR-CONDITIONING			
SEAT BELTS - Front			
SEAT BELTS - Rear			

INSPECTED BY:

FINAL INSPECTION - Car - Chassis No.**FINAL ELECTRICS – Page 1 of 1**Music System Serial Number TAPE ☐ CD ☐ (tick which used)

DESCRIPTION	Pass	Fail	REASON
HEADLIGHTS - Beam and Dip			
PARKING LIGHTS			
INDICATOR LIGHTS - Left			
INDICATOR LIGHTS - Right			
TAIL LIGHTS			
STOP LIGHTS			
NUMBER PLATE LIGHT			
INTERIOR LIGHTS			
INSTRUMENT PANEL LIGHTS			
FOG LAMPS			
ALTERNATOR CHARGE RATE			
HEATER FAN			
AIR-CONDITIONING SYSTEM			
WINDSCREEN WIPERS			
WINDSCREEN WATER JETS			
CLOCK			
FUEL, OIL, TEMPERATURE GAUGES			
CENTRAL LOCKING			
HORN			
BOOT LIGHT			
BATTERY SECURED & EARTHED CORRECTLY			
FAN TIMER OPERATION			
BRAKE FLUID WARNING LIGHT			
FUSE BOX COVER FITTED			
STEERING WHEEL SECURE			
INDICATORS CANCELLING			

INSPECTED BY:

FINAL INSPECTION - Car - Chassis No.**FINAL MECHANICAL – Page 1 of 2**

Engine Number Gearbox Number Diff Number

DESCRIPTION	Pass	Fail	REASON
BRAKES - leaks in engine compartment			
BRAKES - leaks at wheels			
BRAKES - pressure holding for 1 minute			
BRAKES - piping clears wheels			
PARKING BRAKE & LIGHT			
WHEEL NUTS - Tight			
TYRES - correct type fitted & pressure			
FRONT WHEEL BEARINGS			
VEHICLE RIDE HEIGHT			
WHEEL ALIGNMENT - report available			
OIL LEVELS - engine, gearbox & diff			
COOLING SYSTEM - tested for leaks			
CYLINDER HEAD - retorqued			
FAN AND DRIVE BELT - adjustments			
ENGINE IDLE SPEED 700 rpm			
CHOKE OPERATION			
FUEL - leaks			
FUEL MIXTURES - C.O.			
- H.C.			
POWER STEERING FLUID AND OPERATION			
EXHAUST SYSTEM - sound level or leaks			
FRONT SUSPENSION BOLTS TIGHTENED			
REAR SUSPENSION DIFF BOLTS TIGHTENED			
FAN TIMER OPERATION, 5 - 7 minutes			

FINAL INSPECTION - Car - Chassis No.

FINAL MECHANICAL – Page 2 of 2

Engine Number Gearbox Number Diff Number

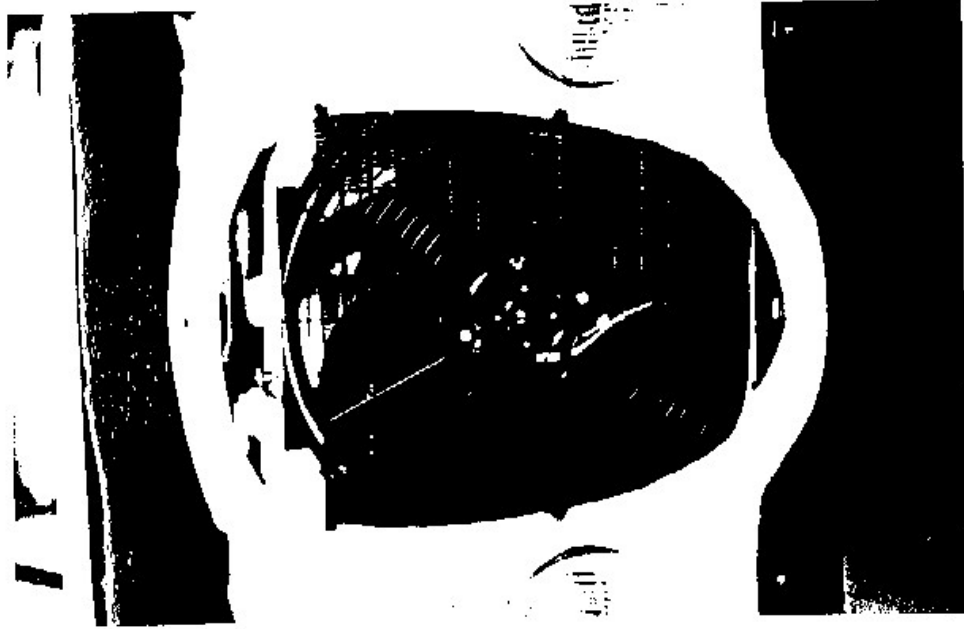
DESCRIPTION	Pass	Fail	REASON
AIR-CONDITIONING CHARGED AND OPERATING EFFICIENTLY			
CRITICAL BOLTS PAINTED			
FINAL ROAD TEST			
OIL LEAKS - Engine			
- Gearbox			
- Diff			

INSPECTED BY:

AND :

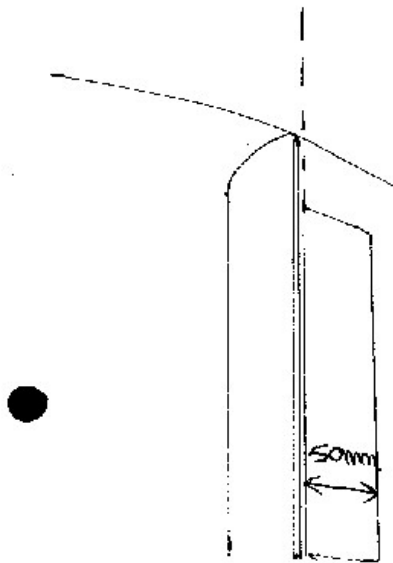
Modification Sketches

Air-conditioner

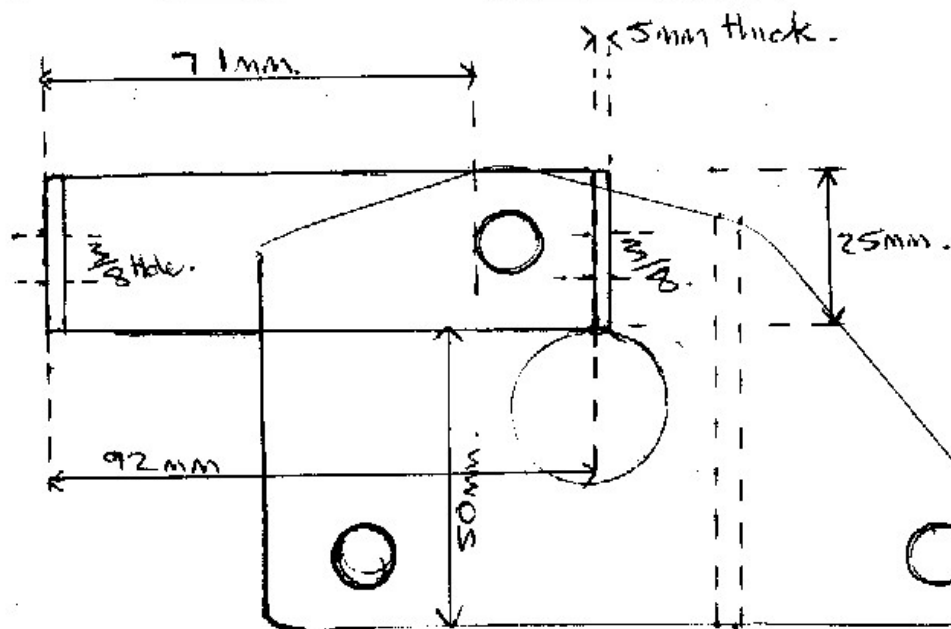
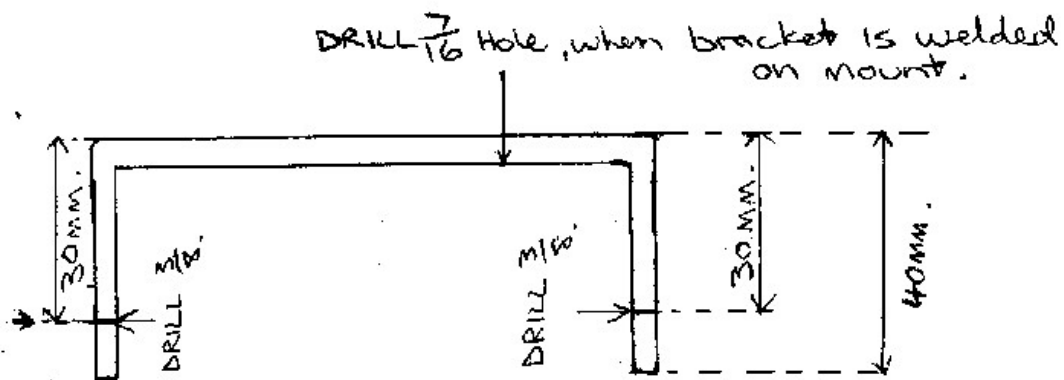


16" DERALE FAN IN FRONT OF
AIR CONDITIONING CONDENSER

CNS011 CONDENSOR MODIFICATION TO BODY.

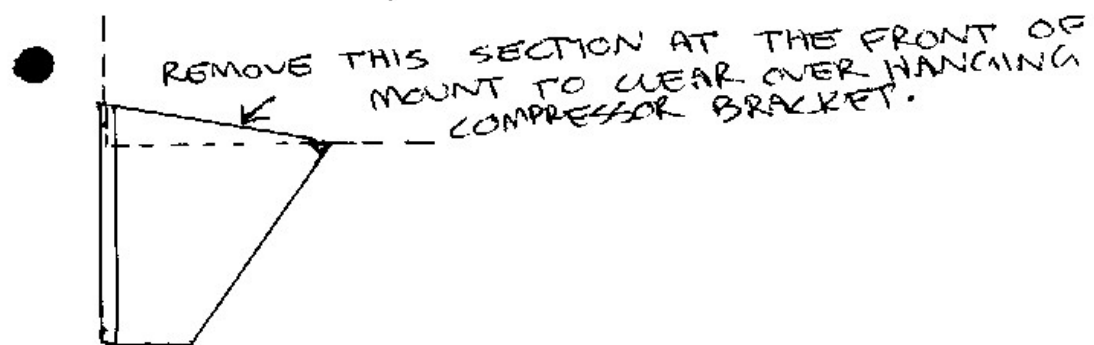
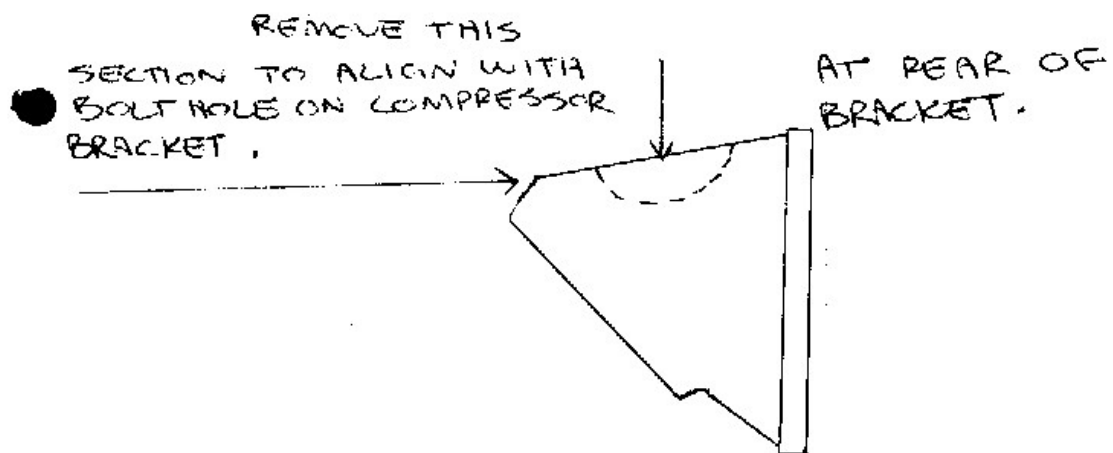


LEFT HAND ENGINE MOUNT WITH
COMPRESSOR (SD507) BRACKET.



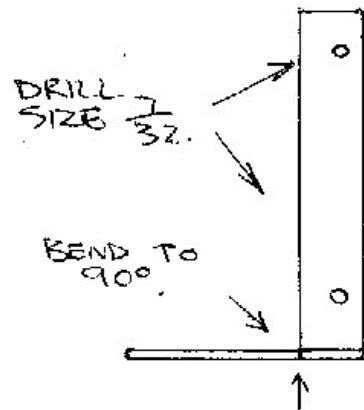
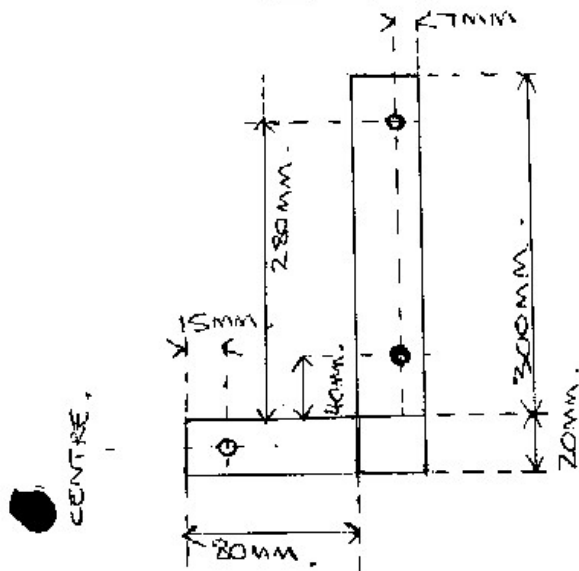
USE GATES 9350 V-BELT.

LEFT HAND ENGINE MOUNT AND COMPRESSOR BRACKET.



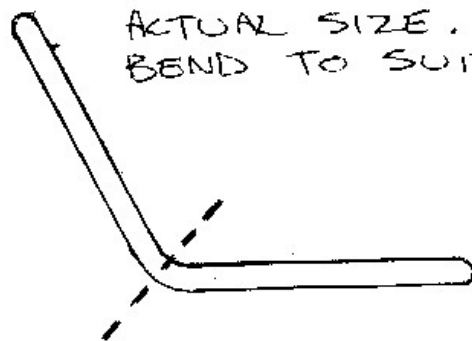
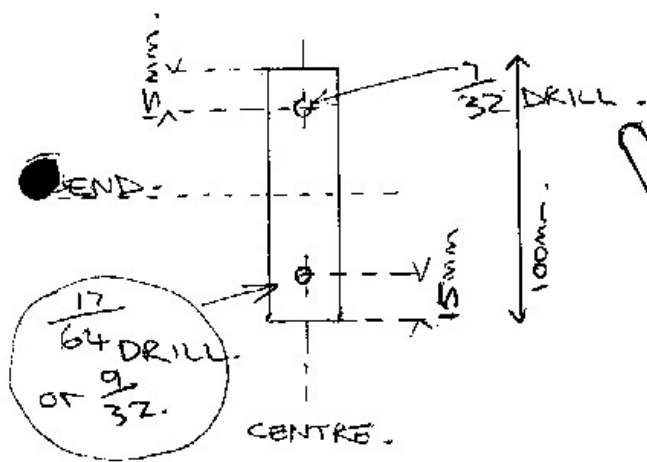
AIR/CON CONDENSOR BRACKETS.
CONDENSOR TYPE. = CN 5011. $21 \times 14 \times 7/8$.

LEFT HAND BRACKET. USE 20mm x 2mm steel.



WELD 80mm Bracket
Here. Do not grind
away strength.

LEFT HAND BRACKET.



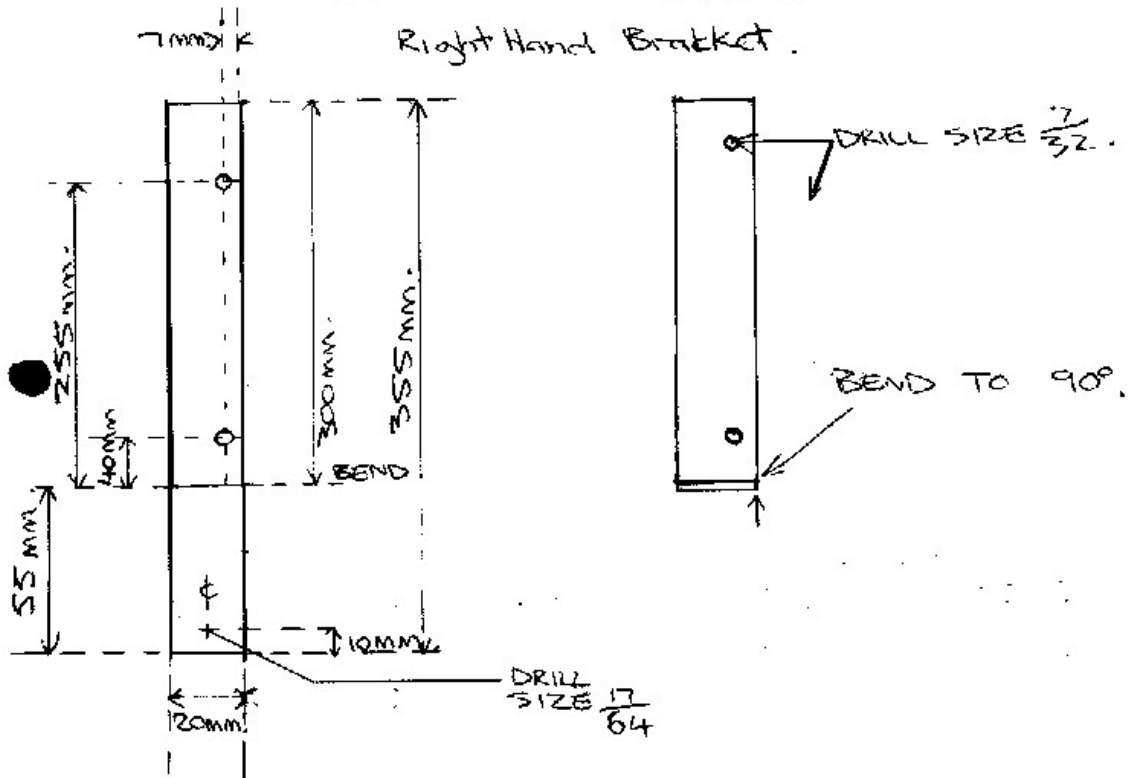
ACTUAL SIZE.
BEND TO SUIT.

1993.

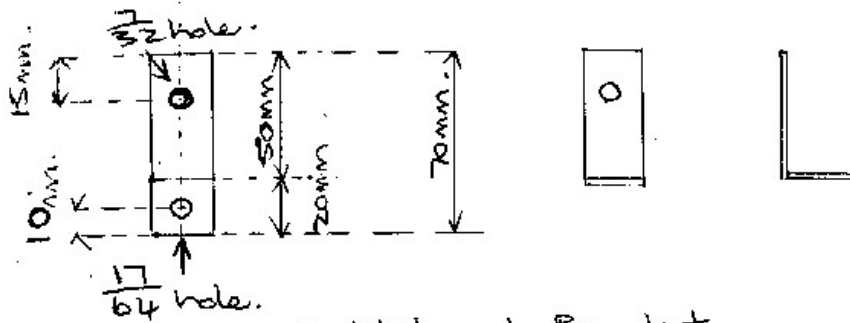
AIR/CON CONDENSOR BRACKETS.
CONDENSOR TYPE = CNS011. 21x14 x 7/8.

USE 20mm x 2mm steel.

Right Hand Bracket.

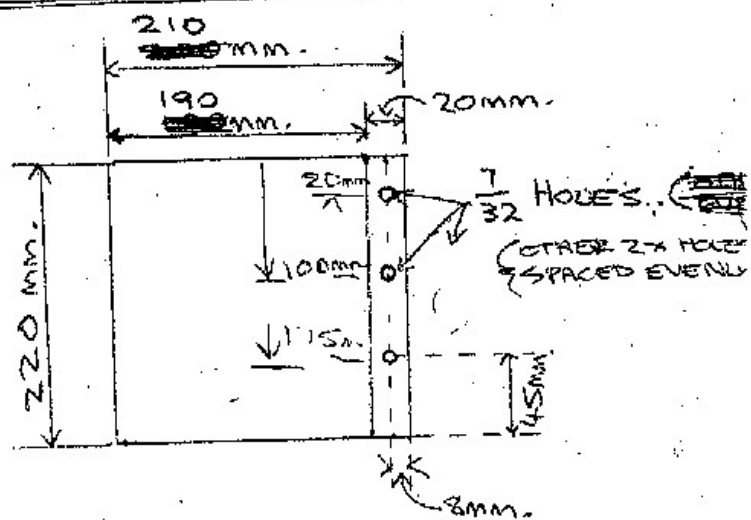


CENTRE.

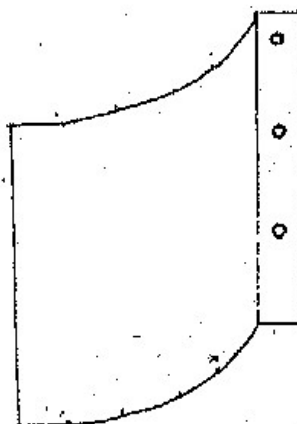


Right hand Bracket.

FILTER DRYER GUARD.



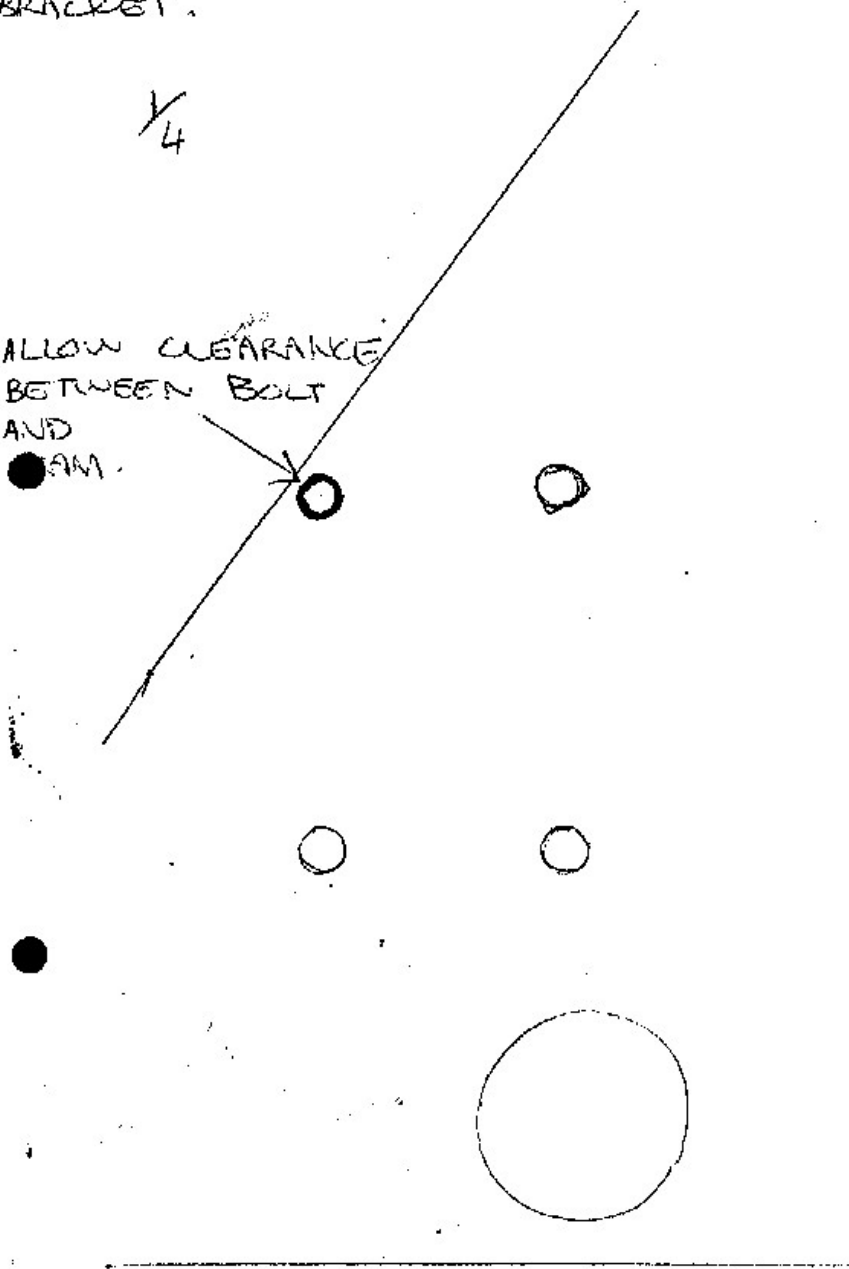
BEND CURVE.



TEMPLATE FOR DRILLING
HOLES - FILTER DRYER
BRACKET.

$\frac{1}{4}$

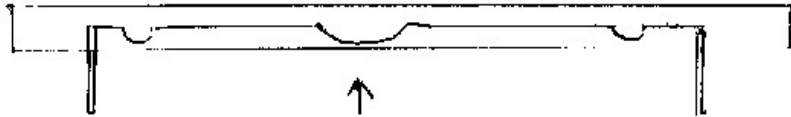
ALLOW CLEARANCE
BETWEEN BOLT
AND
◐ AM.



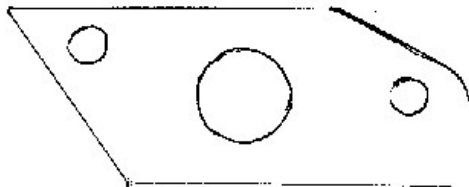
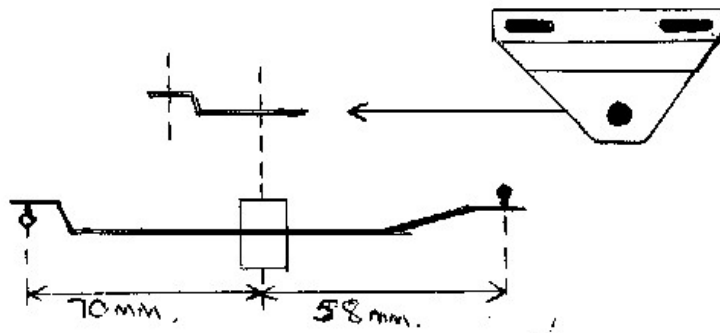
Automatic Gearbox

JAGUAR MK II 340.

RHD Auto.



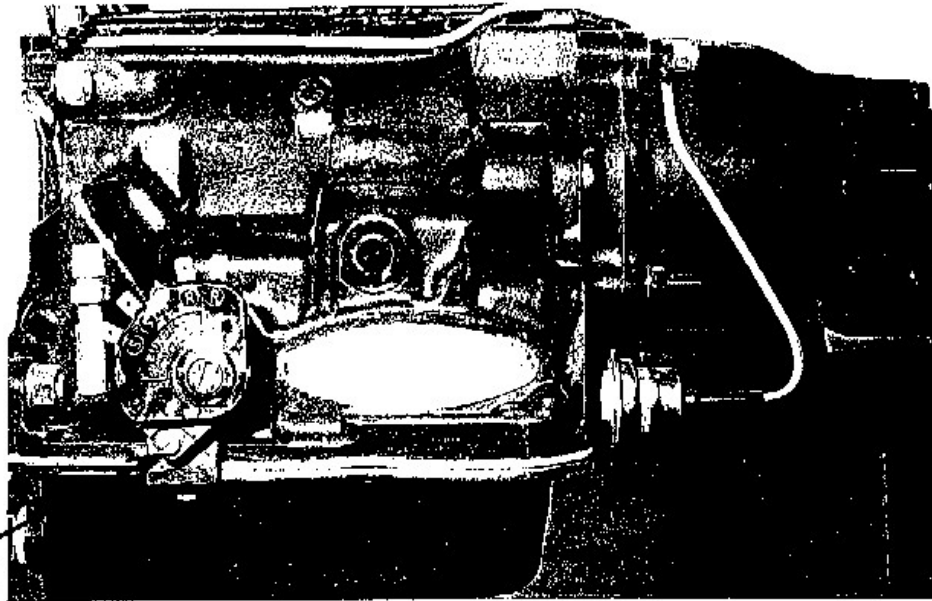
CUT SECTION OUT TO CLEAR
G/Box cable.



Cable Bracket.

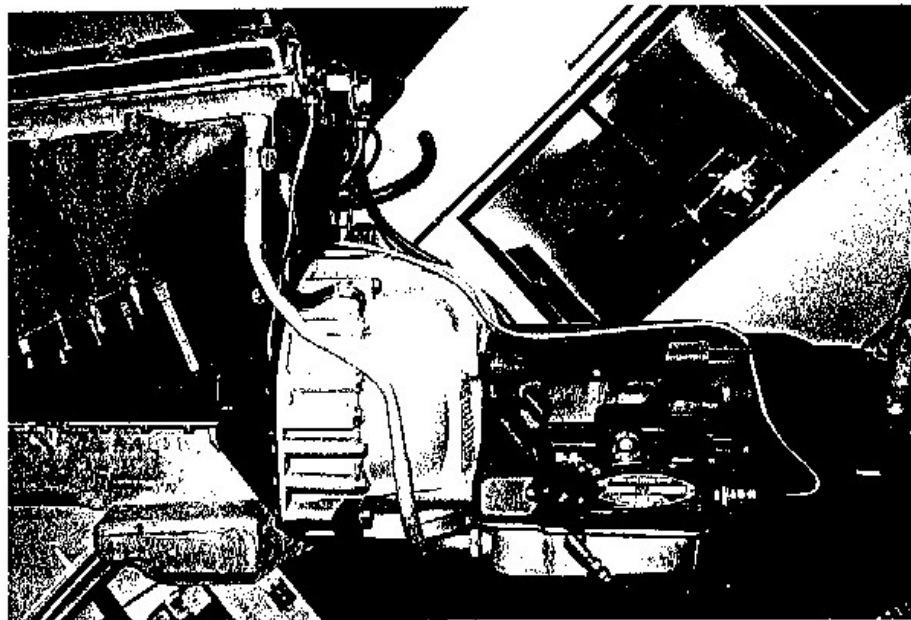
GEAR CHANGE CABLE 20mm OVERALL LENGTH
LONGER THAN STANDARD MK II.

MOD 12 - BORG WARNER

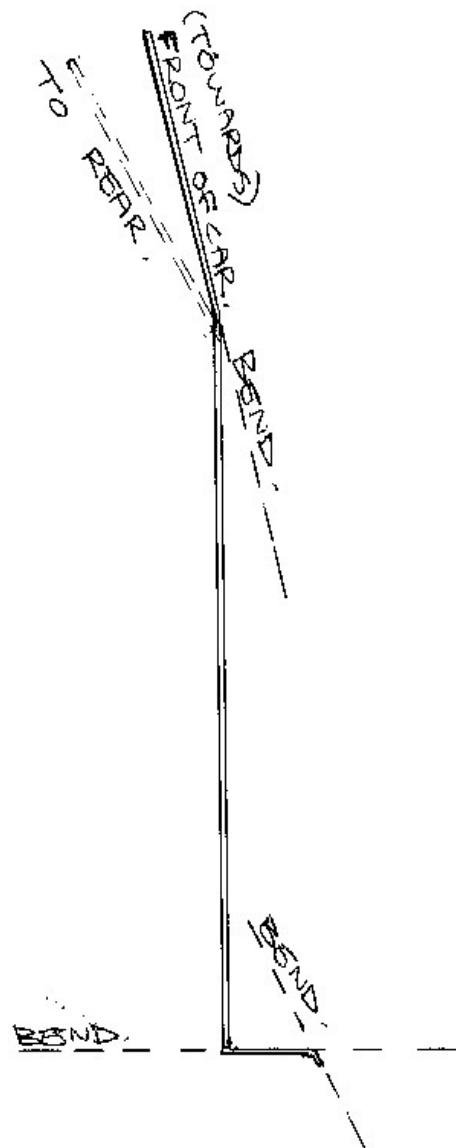


ADJUSTMENT

INHIBITOR SWITCH P/N# RTC 36

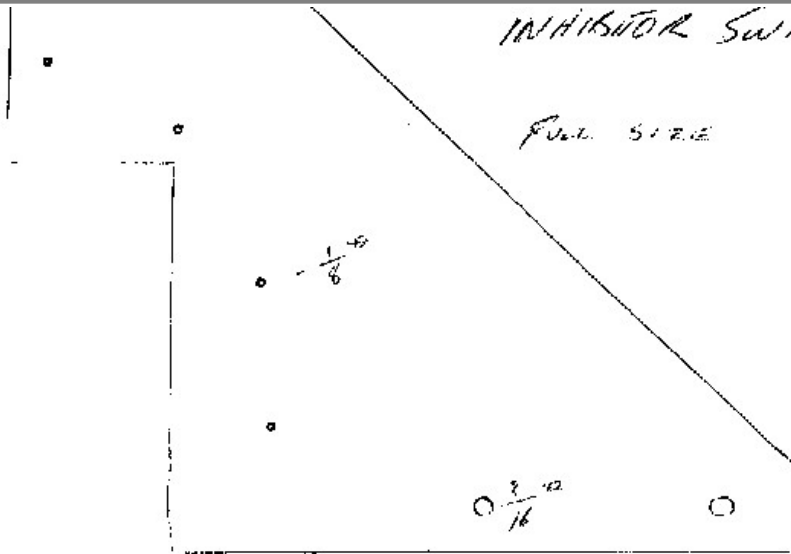


INHIBITOR SWITCH INSPECTION COVER,
SIDE VIEW.

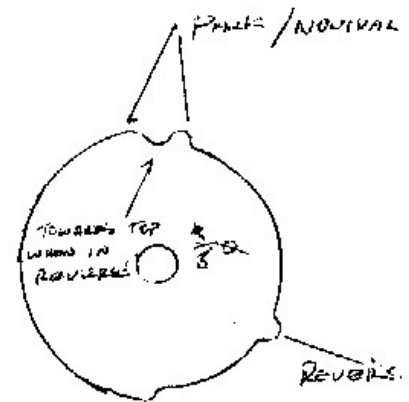
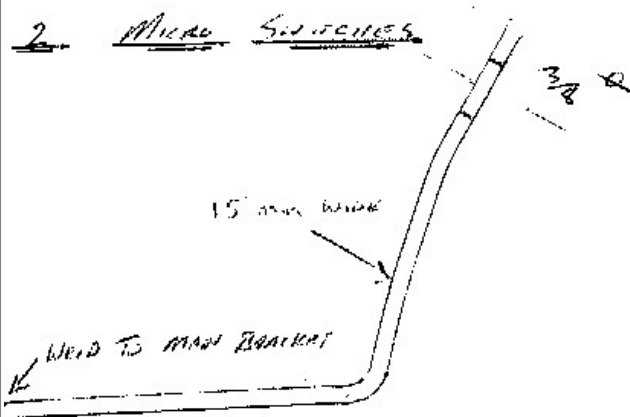


INHIBITOR SWITCH MOD 12.

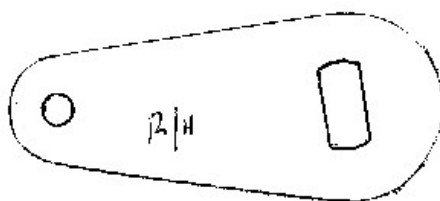
FULL SIZE



2. Micro Switches



Weld to outer of lever with 3 mm space between.



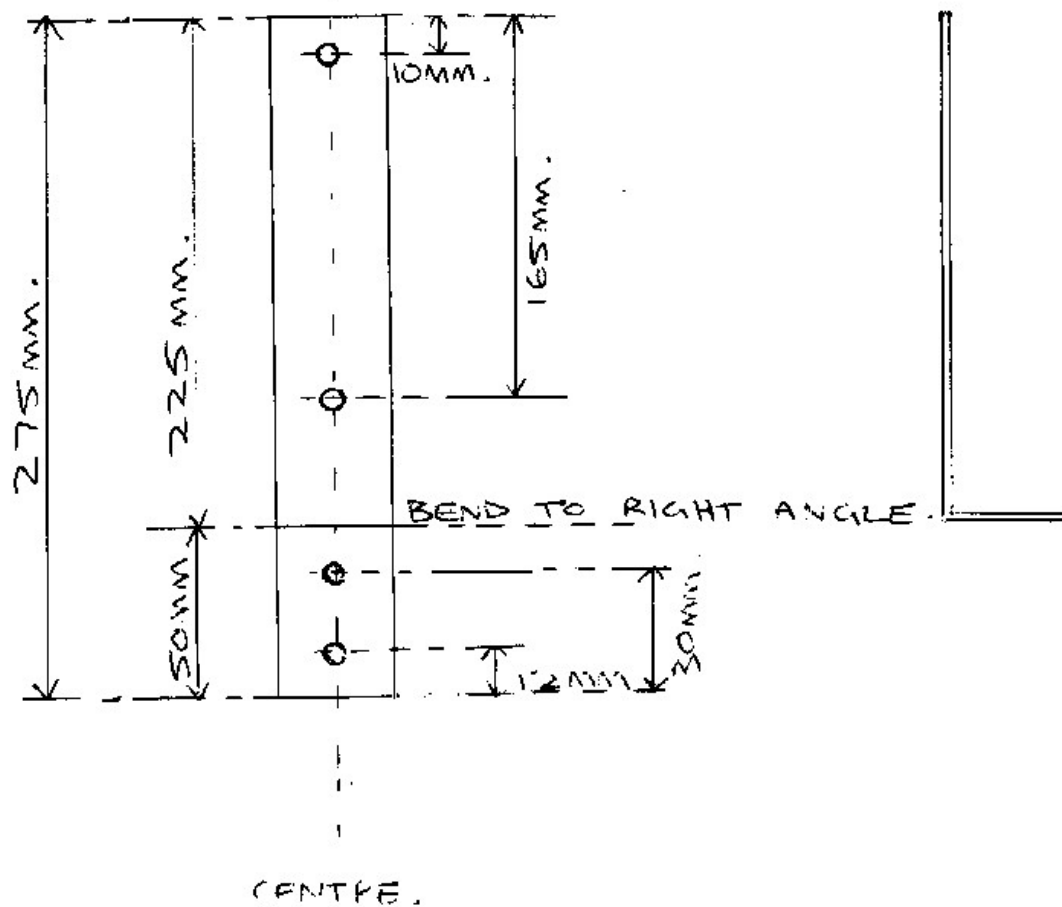
BORG WARNER MOD 12 KICK DOWN MICRO SWITCH



AUTOMATIC TRANSMISSION
COOLER BRACKETS.

RIGHT HAND SIDE.
USE 3MM X 30MM STEEL.
DRILL $\frac{9}{32}$ HOLES.

SIDE VIEW.

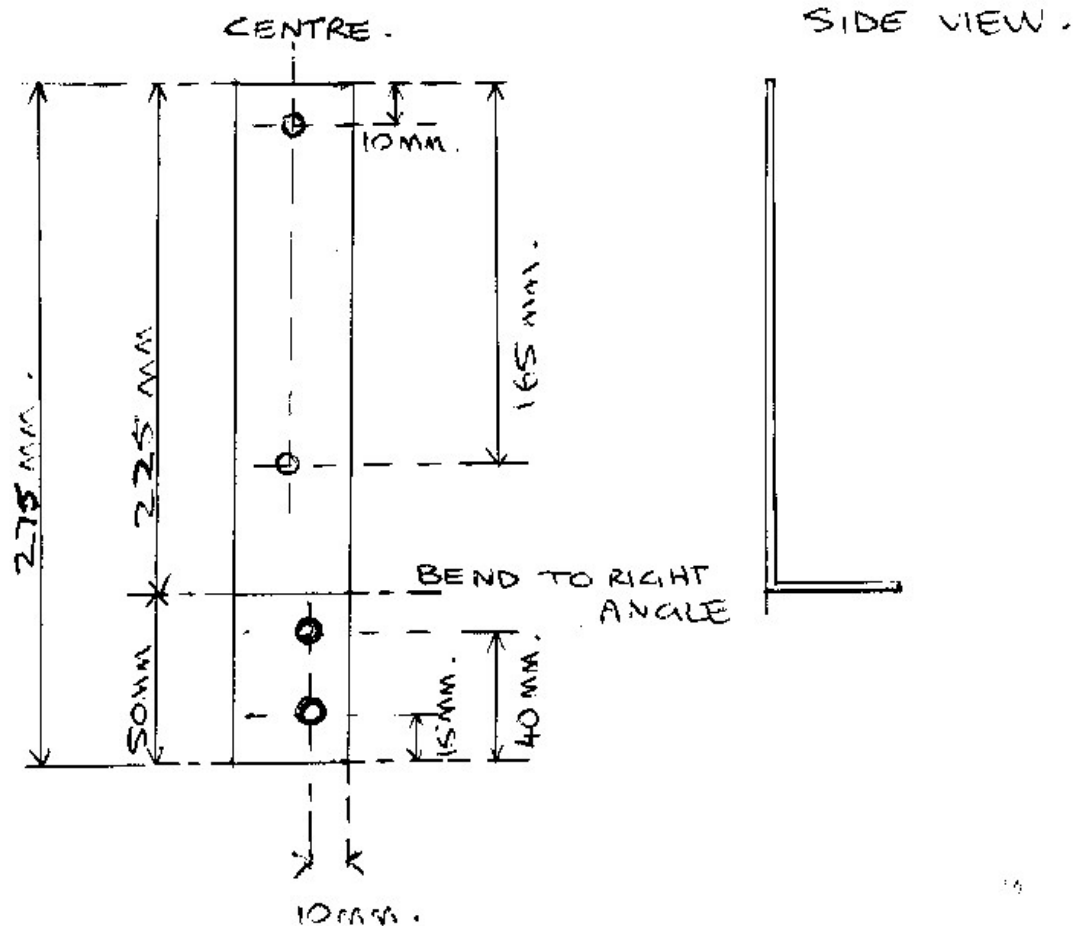


PAGE No 1.
(OF 2)

ONE SET OF
LEFT AND RIGHT
BRACKETS PER CAR.

AUTOMATIC TRANSMISSION COOLER BRACKETS.

LEFT HAND SIDE.
USE 3MM X 30 MM STEEL.
DRILL $\frac{9}{32}$ HOLES.

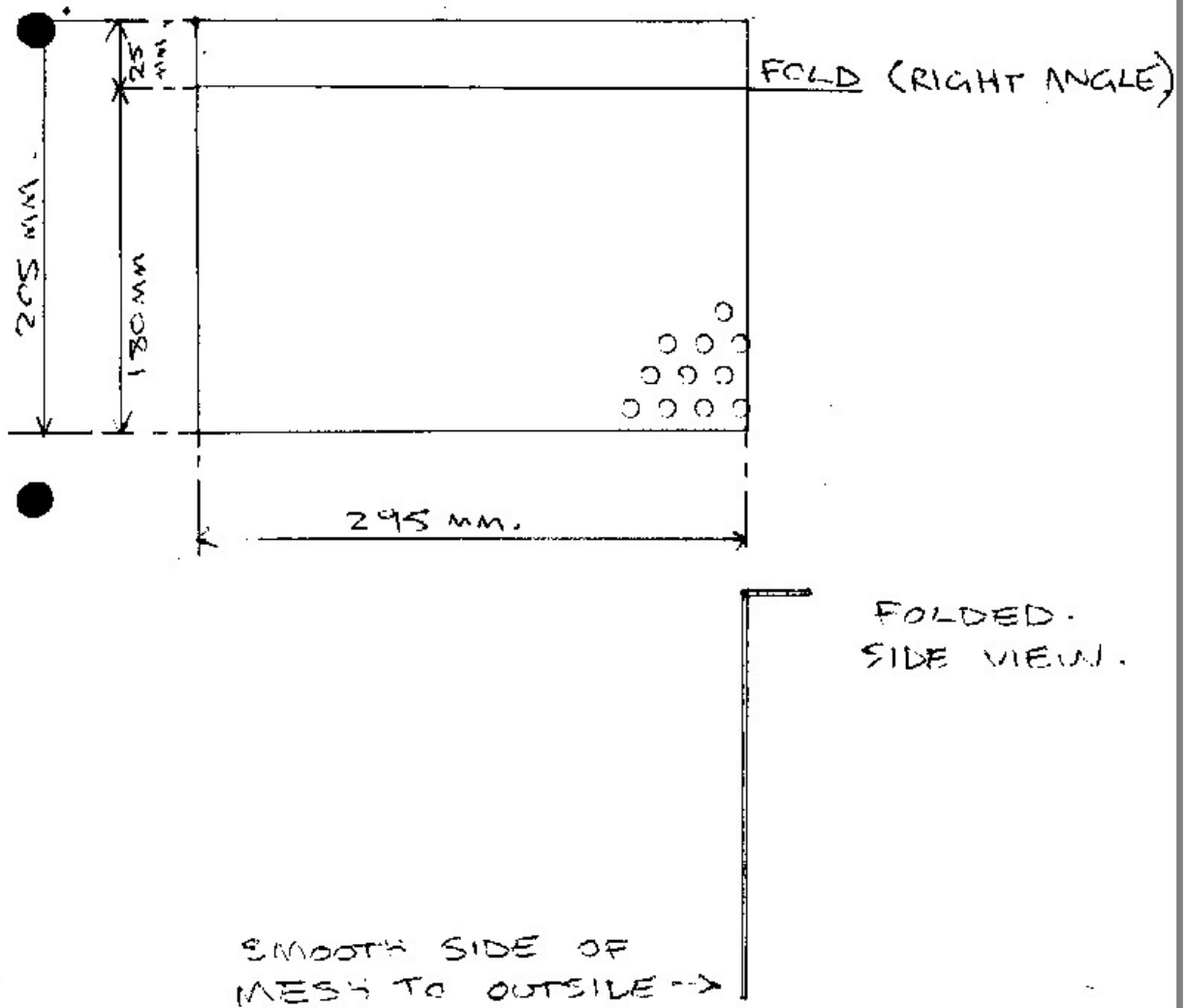


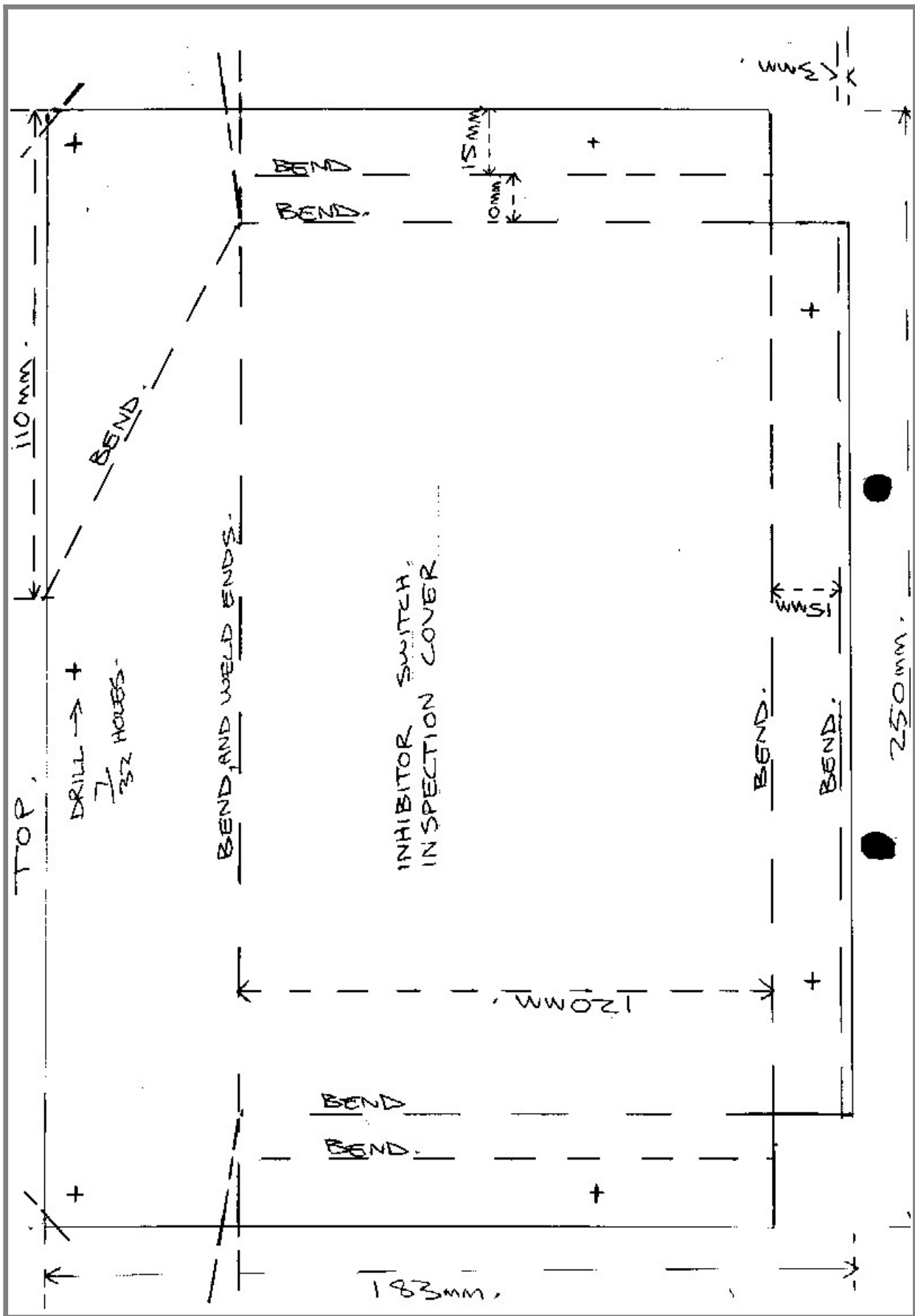
PAGE NP2
(OF 2).

ONE SET OF
LEFT AND RIGHT
BRACKETS PER CAR.

AUTOMATIC TRANSMISSION
COOLER GUARD.
(MESH).

ONE PER CAR



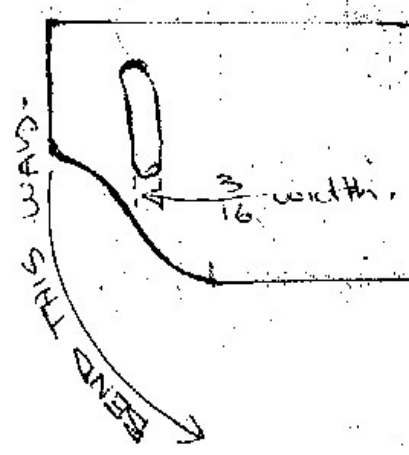


LEFT HAND DRIVE INHIBITOR
SCREW BACKSET.

DRILL $\frac{7}{16}$ HOLE.

FULL SIZE

BEND 90°



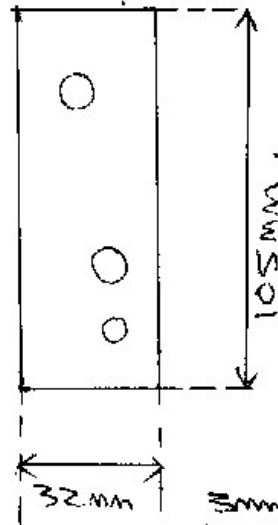
LEFT/HAND DRIVE

AUTOMATIC G/Change
Bracket (inside).

$\frac{5}{16}$ HOLE.

● $\frac{5}{16}$ HOLE.

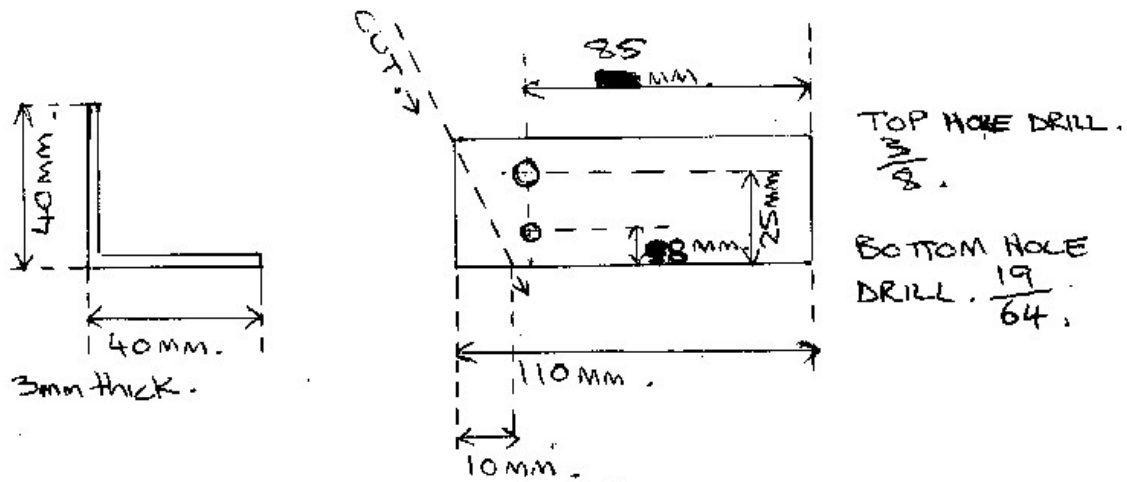
$\frac{1}{4}$ HOLE.




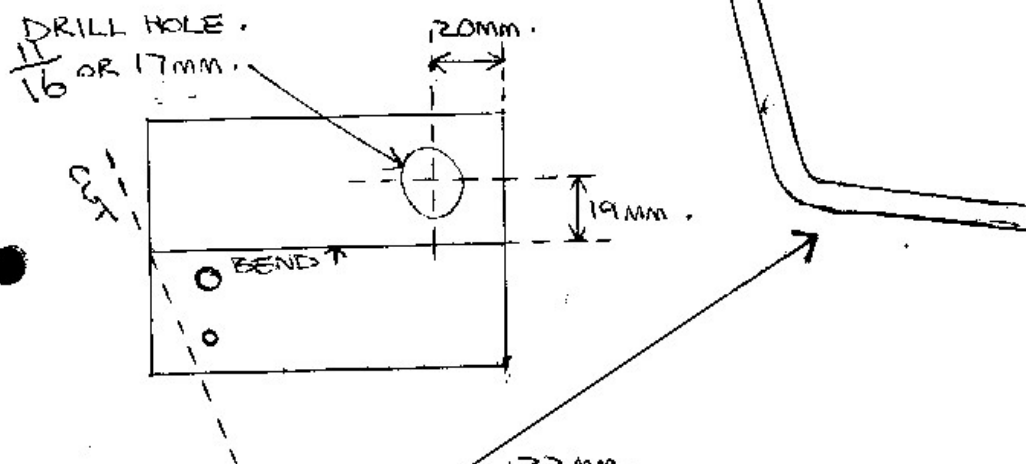
$\frac{5}{16} \times 1''$

$\frac{5}{16} \times 1''$
 $\frac{1}{4} \times \frac{3}{4}$ UNF BOLT.

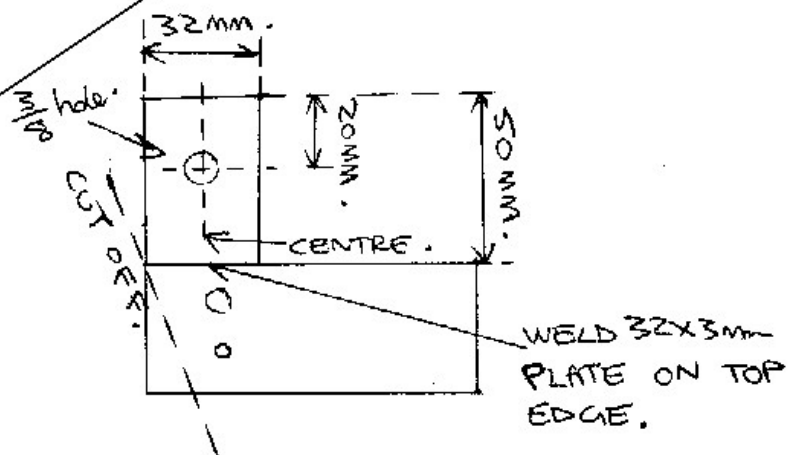
LEFT HAND DRIVE AUTOMATIC GEAR CHANGE BRACKET.



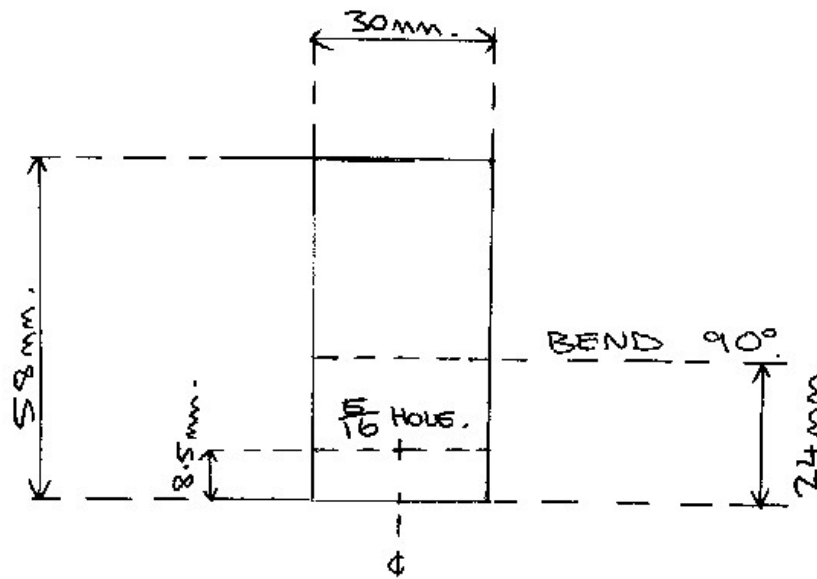
HEAT AND BEND TO THIS  ACTUAL SIZE AND ANGEL.



WELD PLATE, AND CONTINUE SAME CURVE.

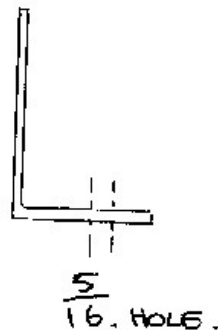


Right Hand Drive inhibitor switch Bracket.
 USING 30mm x 3mm steel.

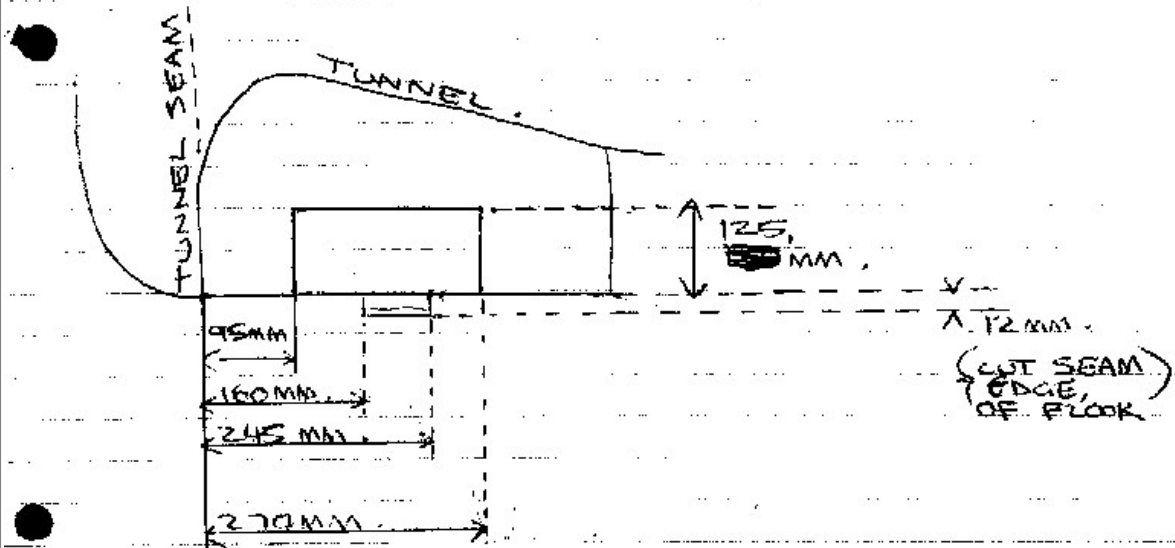


BENT SIDE VIEW.

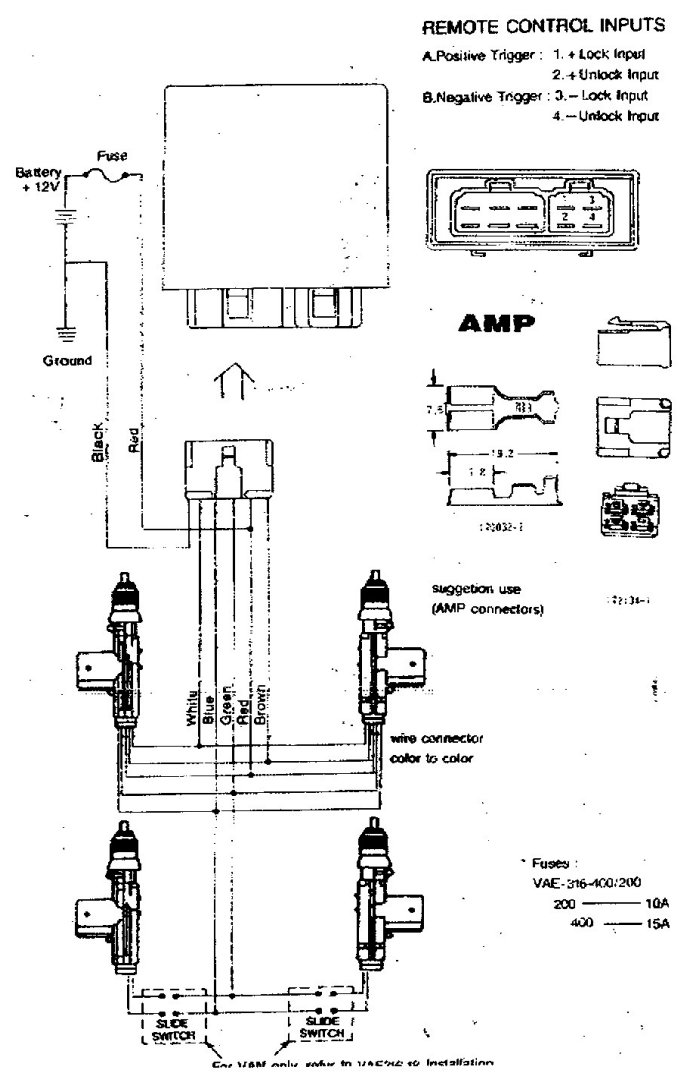
MARK BEND LINE
 ON PLATE AS ABOVE.
 PLACE IN VICE WITH
 BEND LINE FACING
 TO OUTSIDE OF BEND
 DIRECTION.



* TRANSMISSION COVER INSPECTION HOLE.

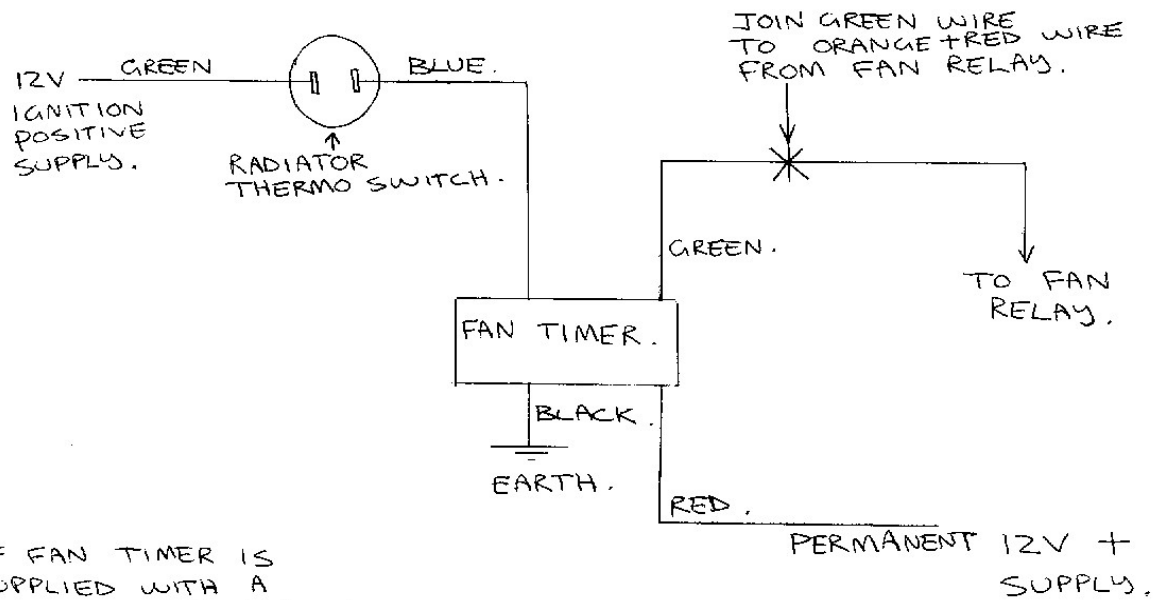


VAE-316-400/200 WIRING DIAGRAM Power Door Locks



13/10/94 09:36 REMPC PLARMS + 64 6 8776077 D01

FAN TIMER.



IF FAN TIMER IS SUPPLIED WITH A BROWN WIRE, INSULATE AND DO NOT USE, connect/ wire.

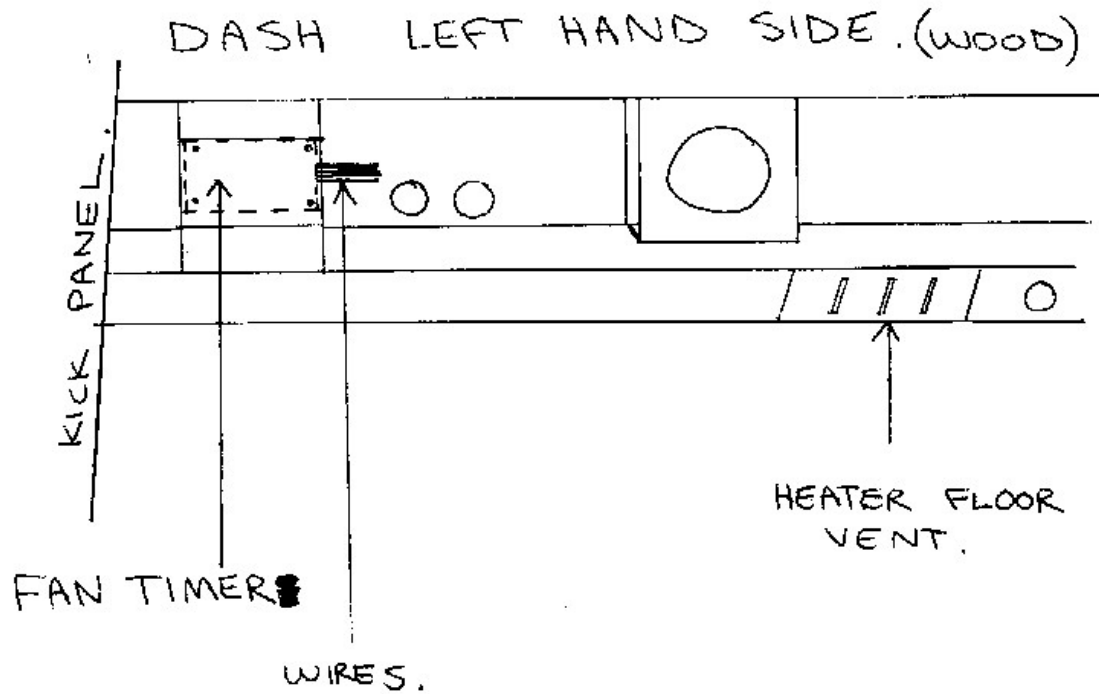
* FAN TIMER.

WE HAVE FOUND A VARIATION IN TIME OF APPROX 1 TO 2 MINUTES IN THE FAN TIMERS DUE TO HEAT IN THE ENGINE BAY ETC, ALTERING RESISTANCE.

THEREFORE AFTER A FAN TIMER HAS BEEN ADJUSTED IN THE CAR WITH THE INSTRUCTION PROVIDED (BY CONNECTING THE TWO WIRES TOGETHER AT THERMO SWITCH WITH ENGINE NOT RUNNING) A MECHANICAL TEST SHOULD BE DONE WITH ENGINE RUN UP TO OPERATING TEMPERATURE AND WAITING FOR FAN TO OPERATE THEN TURNING KEYS OFF AND TIMING FAN.

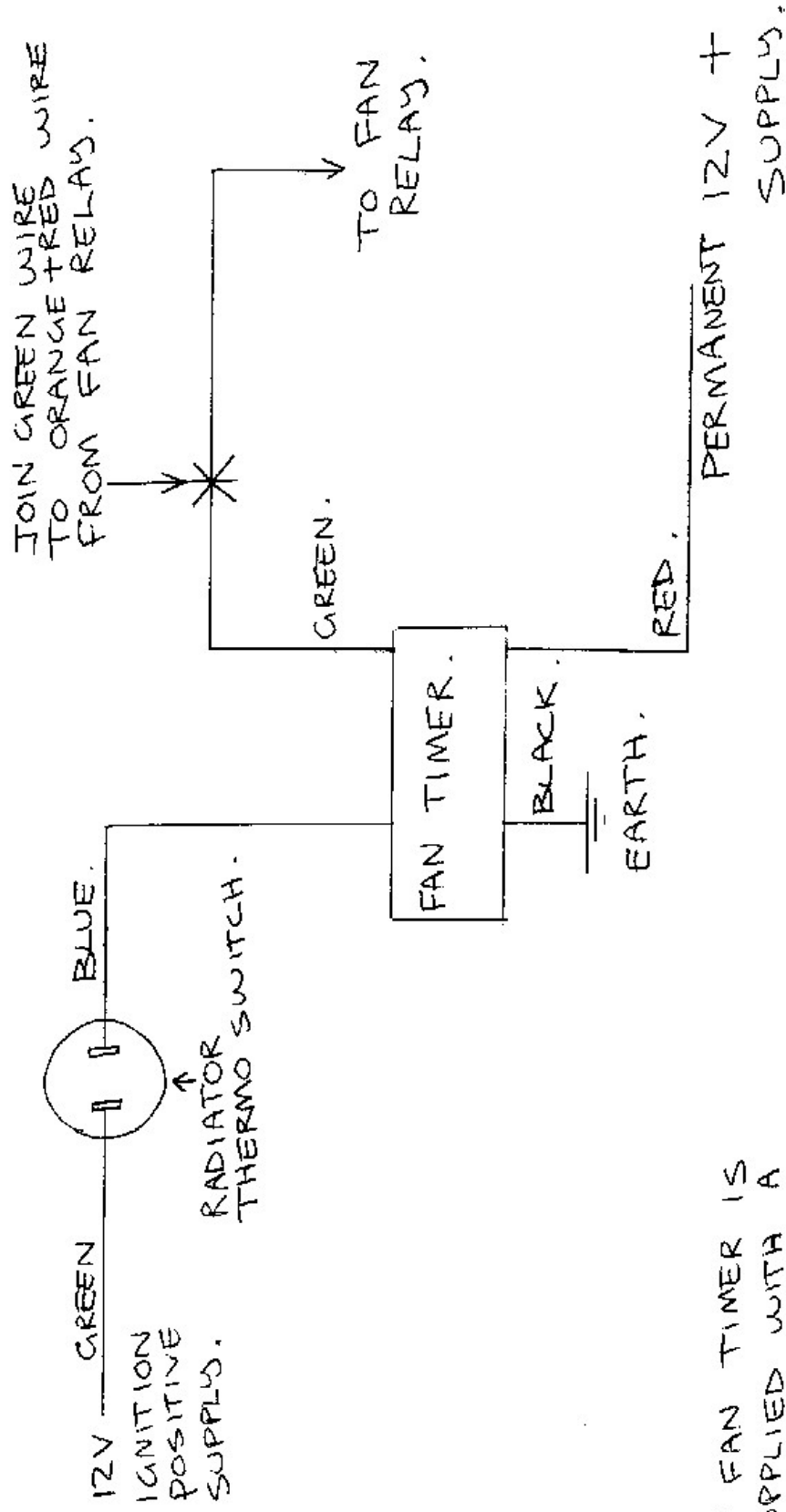
* WARNING - DO NOT LEAVE VEHICLE UNATTENDED WHILE WAITING FOR FAN AND WATCH TEMPERATURE GAUGE.

POSITIONING FAN TIMER INSIDE VEHICLE.



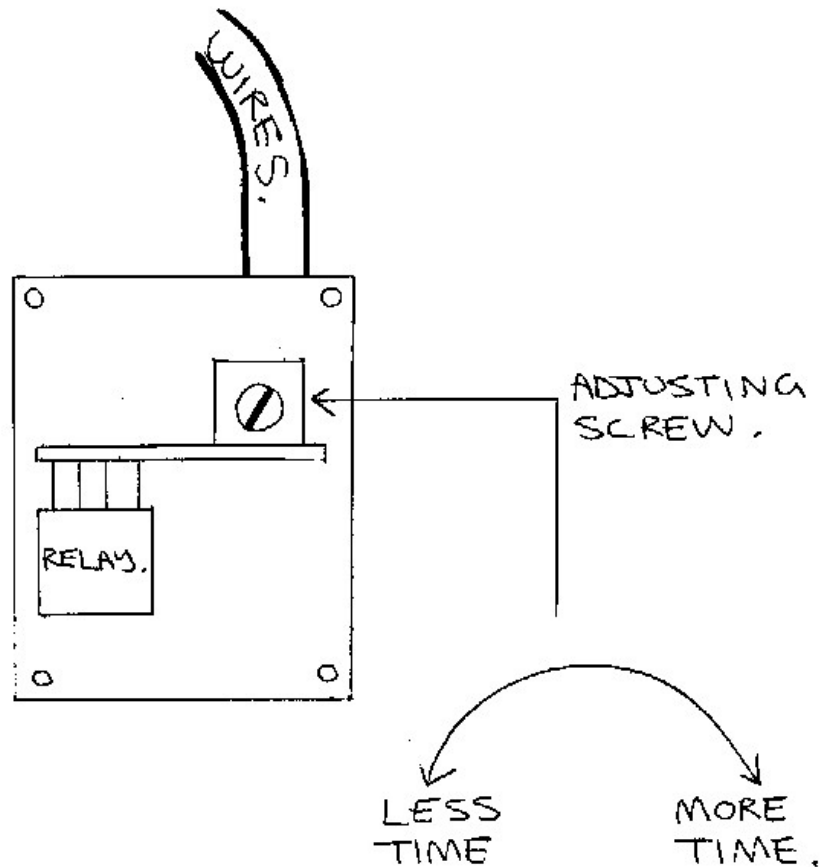
REMOVE PANEL UNDER LEFT SIDE OF DASH.
PLACE FAN TIMER ON PLATE WITH FOAM
INSULATION TO STEEL AND SECURE USING
SOME SUITABLE TAPE.

FAN TIMER.



IF FAN TIMER IS SUPPLIED WITH A BROWN WIRE, INSULATE AND DO NOT USE, connect wire.

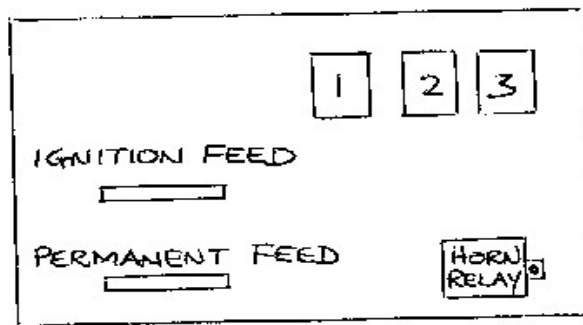
FAN TIMER ADJUSTMENT.



TEST. JOIN THE TWO WIRES TOGETHER AT THE THERMO SWITCH (IN RADIATOR). TURN THE IGNITION KEY ON, THE ELECTRIC FAN WILL START. USING A STOPWATCH-TURN THE IGNITION OFF, AND TIME FROM WHEN THE KEY WAS TURNED OFF UNTIL FAN STOPS.

ADJUST TIME TO 5 MINUTES MINIMUM AND 7 MINUTES MAXIMUM.
RECONNECT WIRES TO SWITCH.

FUSES & RELAYS



RELAYS

- ① FRONT RADIATOR THERMO FAN
- ② AIR CONDITIONING FAN & DRIER SWITCH
- ③ AIR CONDITIONING ENGINE COMPRESSOR

FUSE BLOCK

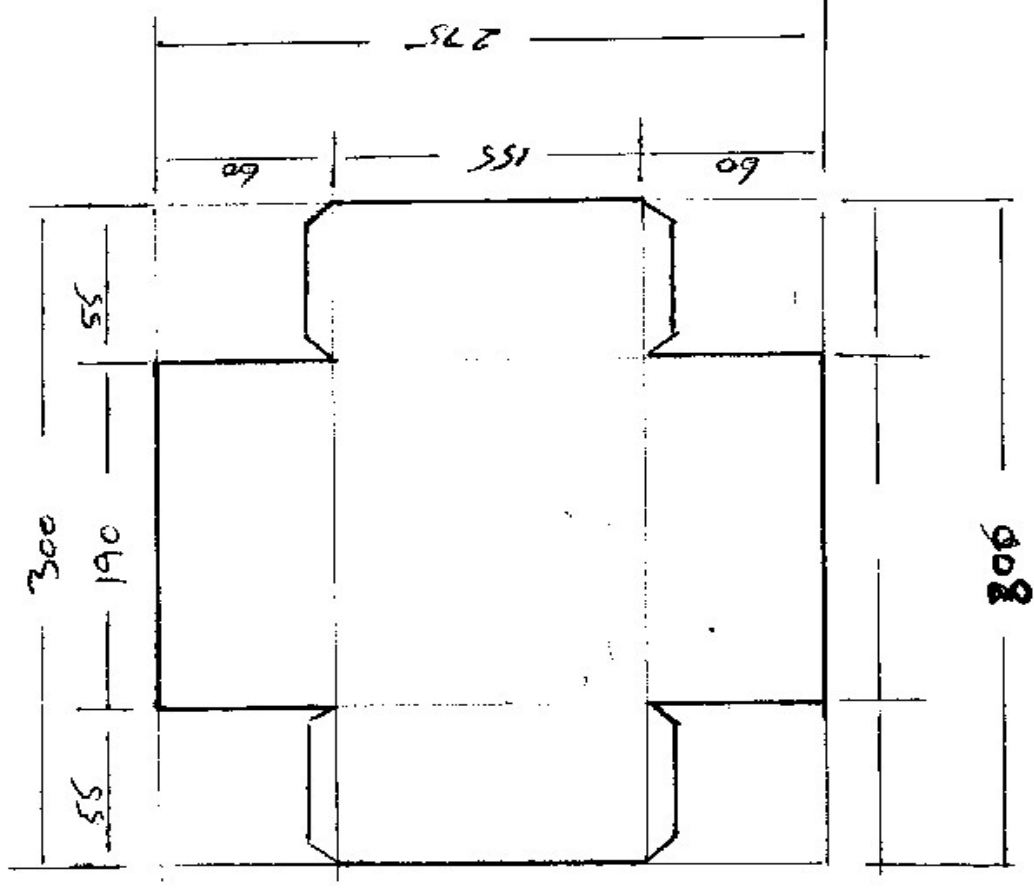
IGNITION FEED - TOP FUSE - GREEN/WHITE

SERVES: HEATER, WIPER, WASHER JET,
AIR CON 3 SPEED FAN SWITCH,
INDICATORS

PERMANENT FEED - BOTTOM FUSE - PURPLE/BROWN

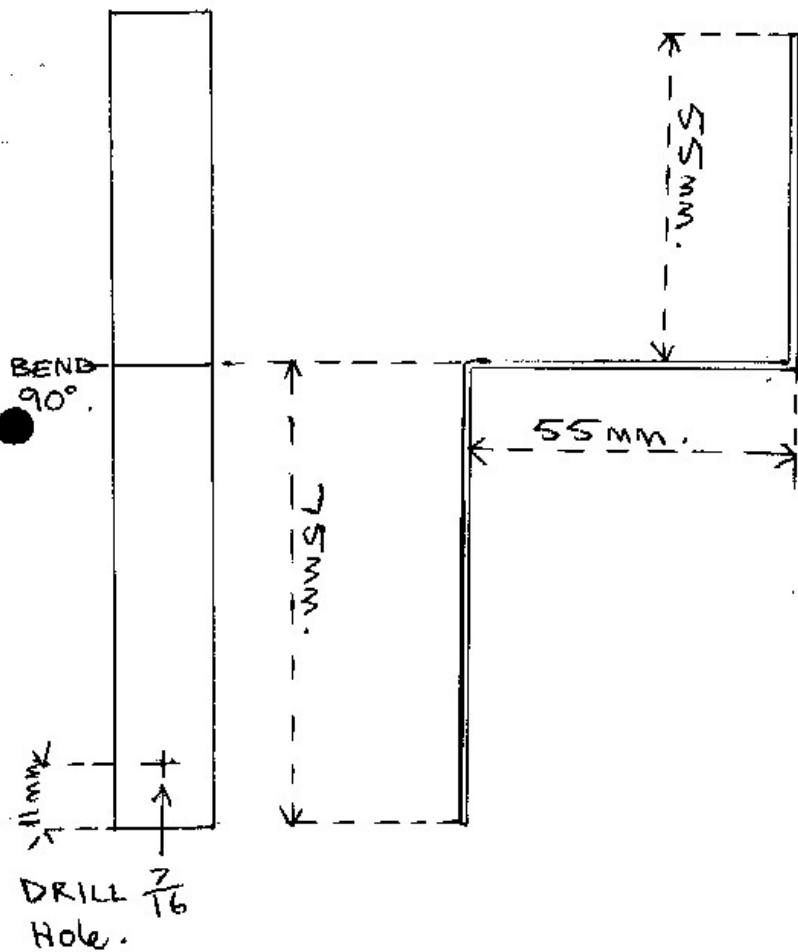
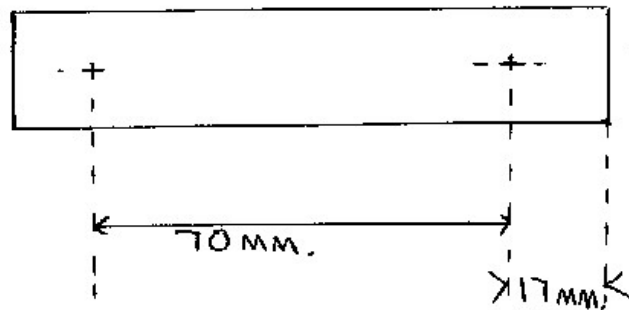
INTERIOR LIGHTS, CENTRAL LOCKING,
MAP LIGHT, CIGAR LIGHTER, HORN,
THERMOFAN TIMER, CLOCK

Fuse Box Cover



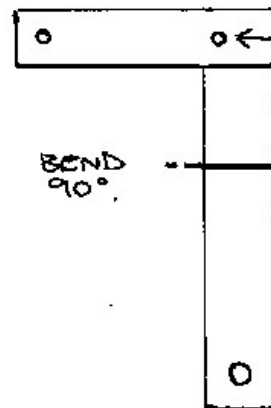
IGNITION AMPLIFIER BRACKET.
(USING 25mm x 3mm steel.)

REQUIRED ON ENGINES WITH UPWARD FACING OIL FILTER.



FINISHED BRACKET.

WELD TOP BRACKET. ↓



DRILL HOLES AFTER WELDED

FAULT,

VEHICLE WILL NOT START (POSSIBLE INHIBITOR SWITCH PROBLEM). IN PARK OR NEUTRAL.

*NOTE - CHECK FIRST THAT LOW GEAR AND PARK CAN BE OBTAINED, IF NOT ADJUST LINKAGE FIRST AND RETEST.

① CHECK BATTERY CONNECTIONS.

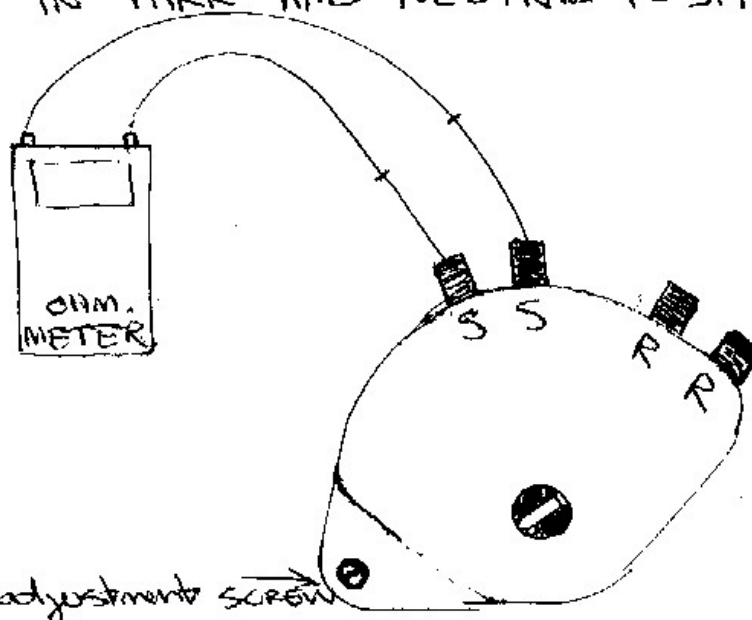
② CHECK TERMINAL CONNECTIONS TO STARTER RELAY.

CHECK POWER TO WHITE + RED WIRE, CRANKING

③ IF POWER IS PRESENT A VISUAL INSPECTION OF INHIBITOR SWITCH WIRES WILL BE REQUIRED FROM UNDERNEATH THE VEHICLE.

*CAUTION IF EXHAUST SYSTEM IS HOT.

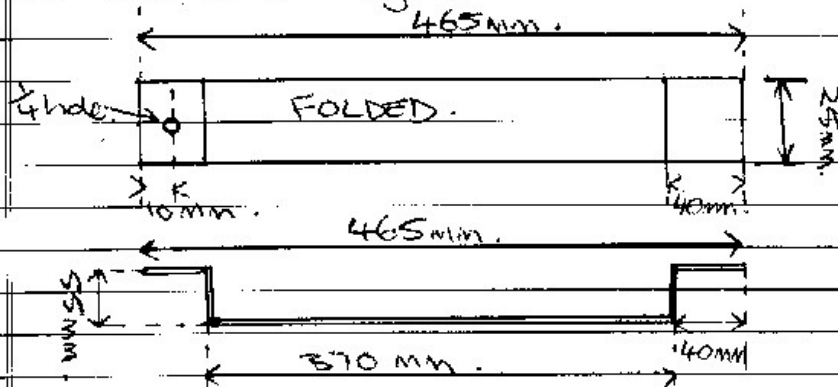
④ USING A OHM METER TEST CONTINUITY BETWEEN THE TWO 'S' TERMINALS, TEST IN PARK AND NEUTRAL POSITIONS.



{ THE TWO 'R' TERMINALS SHOULD HAVE }
CONTINUITY IN REVERSE ONLY.

ELECTRIC COOLING FAN BRACKETS. (KENLOWE).

DRILL $\frac{1}{4}$ hole
on one side only.



Total Length before bending = 560 mm.

Lucas constant energy ignition

A Lucas Constant Energy Ignition System fitted to XJ 4 2 E F.I. Models on Series III. The new ignition system operates by maintaining the energy stored in the coil at a constant level, allowing the output voltage to remain constant over a wide range of engine speeds. The power dissipated in both the coil and module compared with equivalent constant dwell systems is greatly reduced.

Constant energy system component description

Amplifier AB 14

The amplifier (1, Fig. 93) consists of a solid state electronic module housed in an aluminium case with two pre-wired leads (2, Fig. 93) which connect to the low tension terminals on the ignition coil.

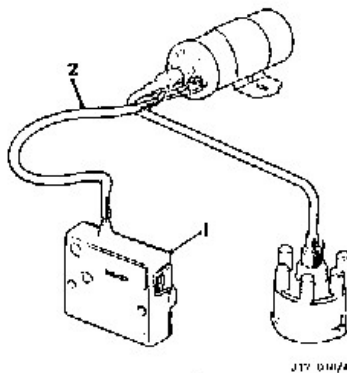


Fig. 93

Connection from the distributor pick-up module is made by an assembly of two leads (1, Fig. 94) inside a screening braid which plugs into a socket on the amplifier side. The amplifier mounting as shown in (2, Fig. 94).

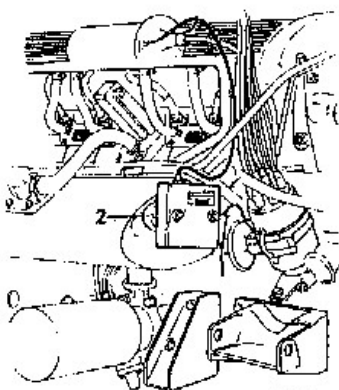


Fig. 94

Distributor (46 DM)

The distributor incorporates a standard automatic advance system, anti-flash shield (1, Fig. 95), rotor arm, and cover (2, Fig. 96). The previous pick-up and module assembly is replaced by a reluctor and pick-up module (3, Fig. 96). The reluctor is a gear-like component (with as many teeth as there are cylinders) which is mounted on the distributor drive shaft.

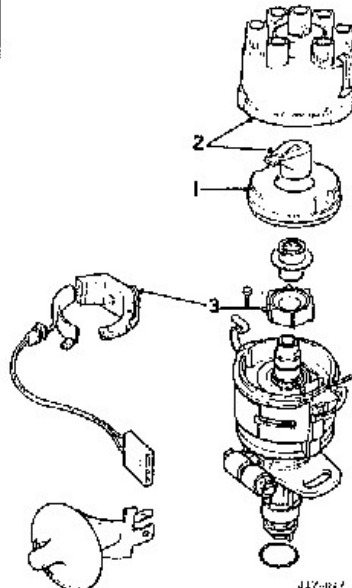


Fig. 95

The pick-up module consists of a winding around a pole-piece attached to a permanent magnet.

The distributor is pre-wired with two leads terminating in a moulded two-pin inhibited connector, which plugs into the amplifier previously described.

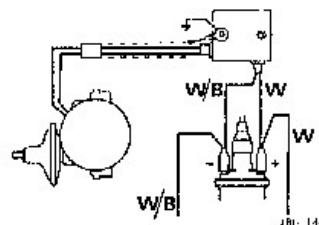


Fig. 96

During normal service the air gap between the reluctor and the pick-up module does not alter and will only require re-setting if it has been tampered with. If it is necessary to adjust the gap, then it should be set such that the minimum clearance between the pick-up and the

reluctor teeth is not less than 0.20 mm (0.007 in). The gap should not be set wider than 0.31 mm (0.014 in).

The air gap is measured between a reluctor tooth and the pick-up module (1, Fig. 97) and should be checked with a plastic feeler gauge. The use of a metal feeler gauge may result in a misleading gauge reading due to the pick-up module contacts being magnetic. However, their use will not affect the electrical operation of the pick-up module.

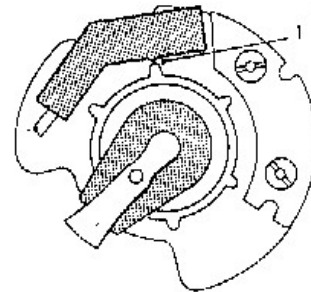


Fig. 97

When the reluctor tooth passes across the pick-up limb, the magnetic field strength around the pick-up winding is intensified creating a voltage in the winding. The use and is of this voltage is sensed by the amplifier and is used to trigger the output stage of the amplifier, which in turn switches on and off the current flowing in the primary winding of the HT coil. The amplifier controls the maximum current flowing in the primary circuit.

Two HT coils are incorporated on the V12 engine. The main coil primary winding is connected in parallel with the primary winding of the auxiliary coil.

The HT section of the auxiliary coil is not used and the HT outlet is sealed.

The auxiliary coil enables the ignition system to achieve the required performance at high engine speeds under load. The constant energy electronic ignition system employs output current limiting and variable dwell for optimum performance. A long dwell is provided at high speeds for adequate energy storage in the coil and a dwell is provided at low speeds for minimum power dissipation. The output current limiting function of the amplifier maintains the storage energy for spark, and the system open circuit voltage remains constant over a wide engine speed range.

It eliminates the need for a ballast resistor whilst ensuring correct current flow at all times even when the engine is cranking. No current flows through the HT coil when the ignition is switched on and the engine is stationary.

WARNING: The amplifier is a sealed unit containing Beryllia. This substance is extremely dangerous if handled. Do not attempt to open the amplifier module.

ELECTRICAL SYSTEM

CONSTANT ENERGY IGNITION TEST

Test 1

Check the battery. A heavy discharge test will determine whether the battery is capable of supplying the heavy currents required by the starter motor.

Check the specific gravity of the electrolyte in each cell. A variation of 0.040 in any cell means the battery is suspect.

Test 2

Check for HT spark. Remove the HT lead from the centre of the distributor cap and hold the lead approximately 6 mm (0.25 in) from the engine (Fig. 90). Crank the engine. If a good spark is obtained, check the HT leads, spark plugs, distributor cap, and rotor.

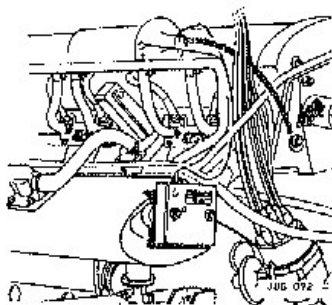


Fig. 90

Test 3

With ignition switched on, the voltage at the HT coil positive terminal (Fig. 99) should be 12 volts. If the voltage is less than 11 volts check wiring to/from the ignition switch.

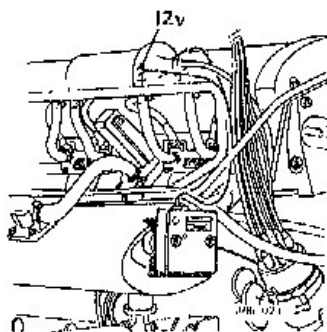


Fig. 99

Test 4

With ignition switched on the voltage at the negative terminal of HT coil should be 12 volts (Fig. 100).

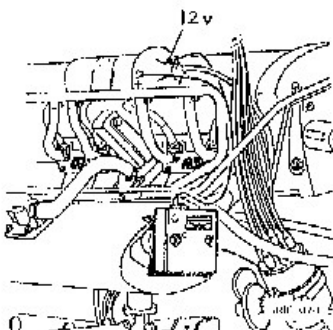


Fig. 100

If a zero reading is obtained, disconnect the lead to the amplifier from the negative terminal of the HT coil (Fig. 101).

If the voltage is zero, a faulty HT coil is indicated.

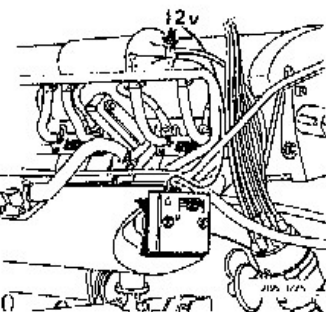


Fig. 101

A 12 volt reading indicates a faulty amplifier.

Test 5

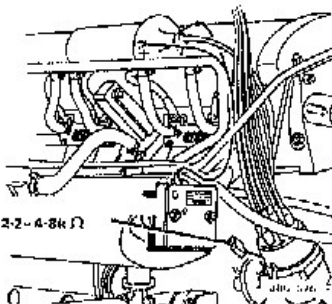


Fig. 102

Disconnect the distributor pick-up leads from the amplifier, and measure the resistance of the pick-up coil. The resistance should be 2.2 to 4.8 ohms (Fig. 102).

Test 6

Connect a test lamp to the negative terminal of the HT coil and earth. Crank the engine. The lamp should dim and flicker slightly (Fig. 103).

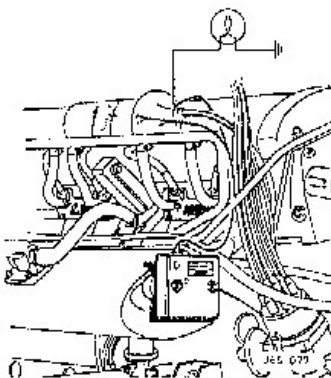
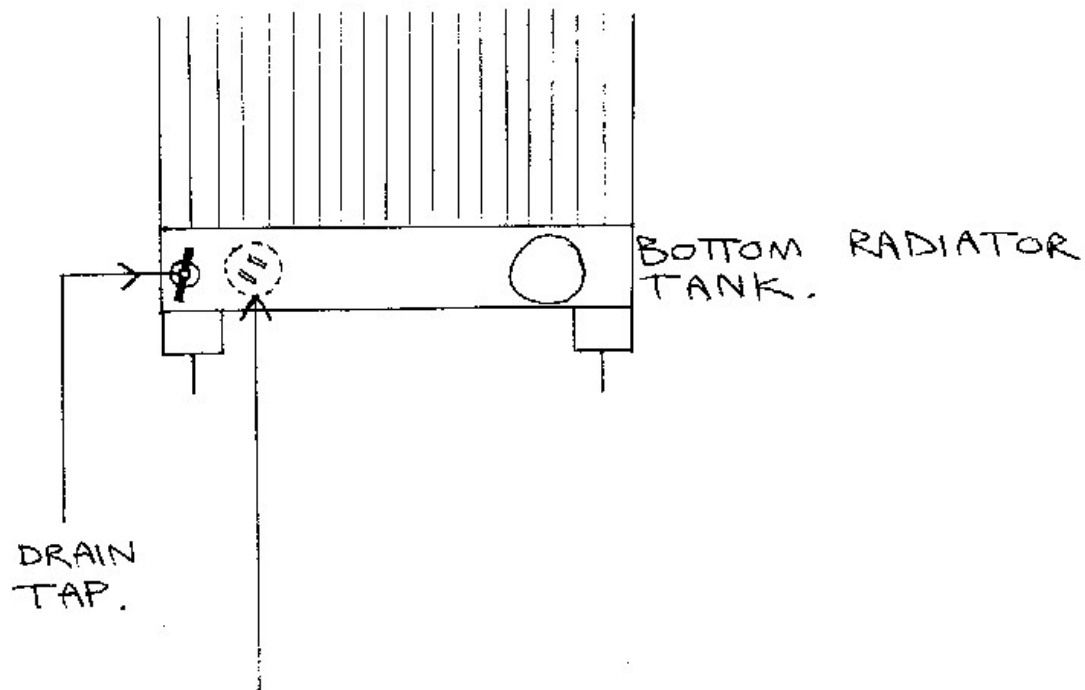


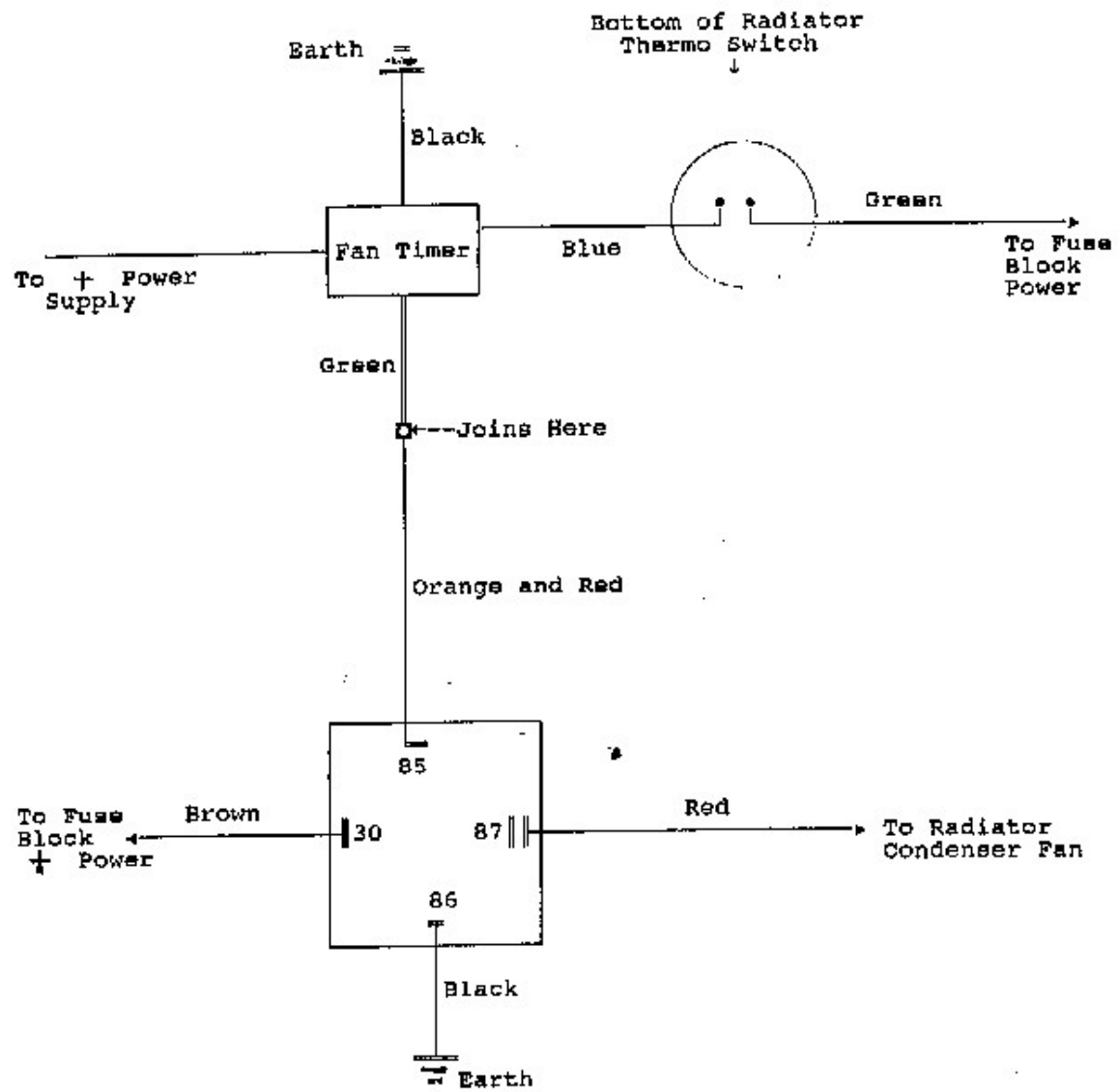
Fig. 103

NEW POSITION FOR 82°-68°C ELECTRIC FAN SWITCH.

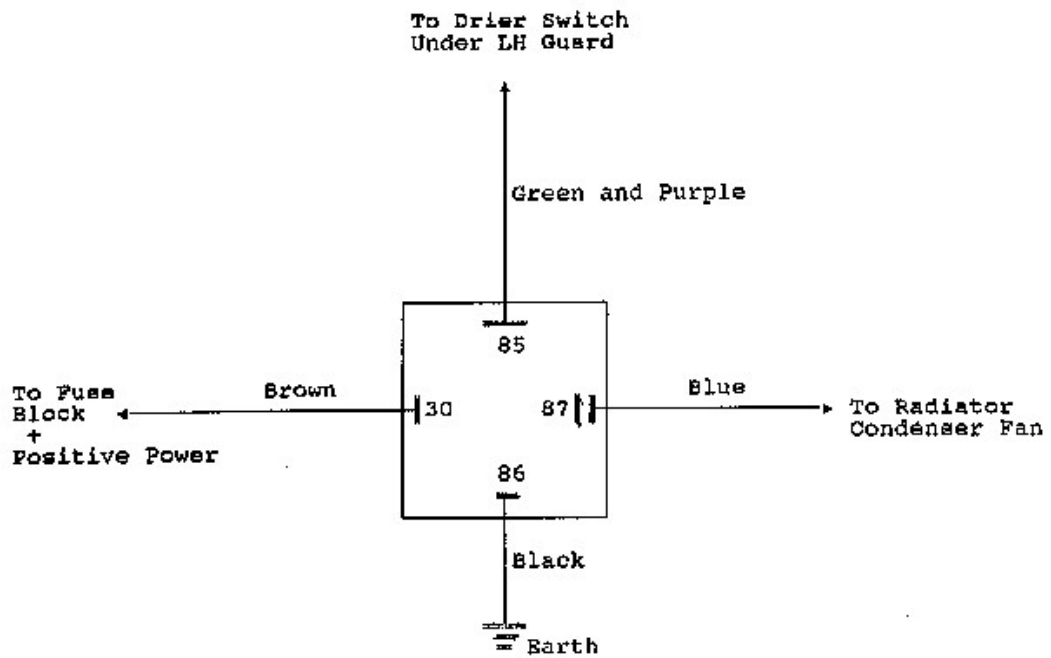


REMOVE THE SWITCH AND THREADED FITTING FROM THE TOP OF RADIATOR.
BLANK THE TOP HOLE, IN RADIATOR.
PLACE THREADED FITTING HERE IN BOTTOM TANK OF RADIATOR.
FIT NEW-TYPE SENDER UNIT (82°-68°C).

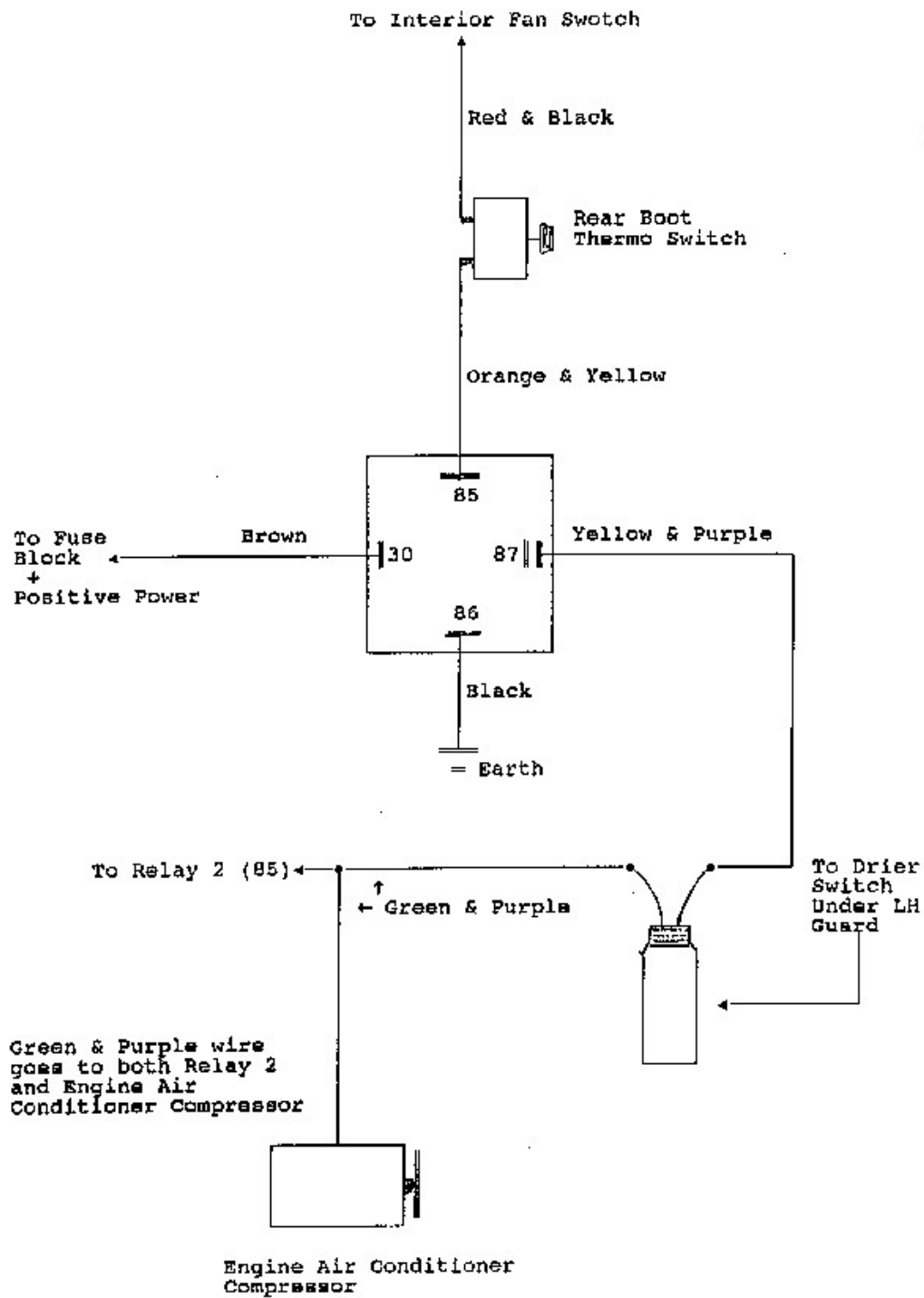
RELAY 1

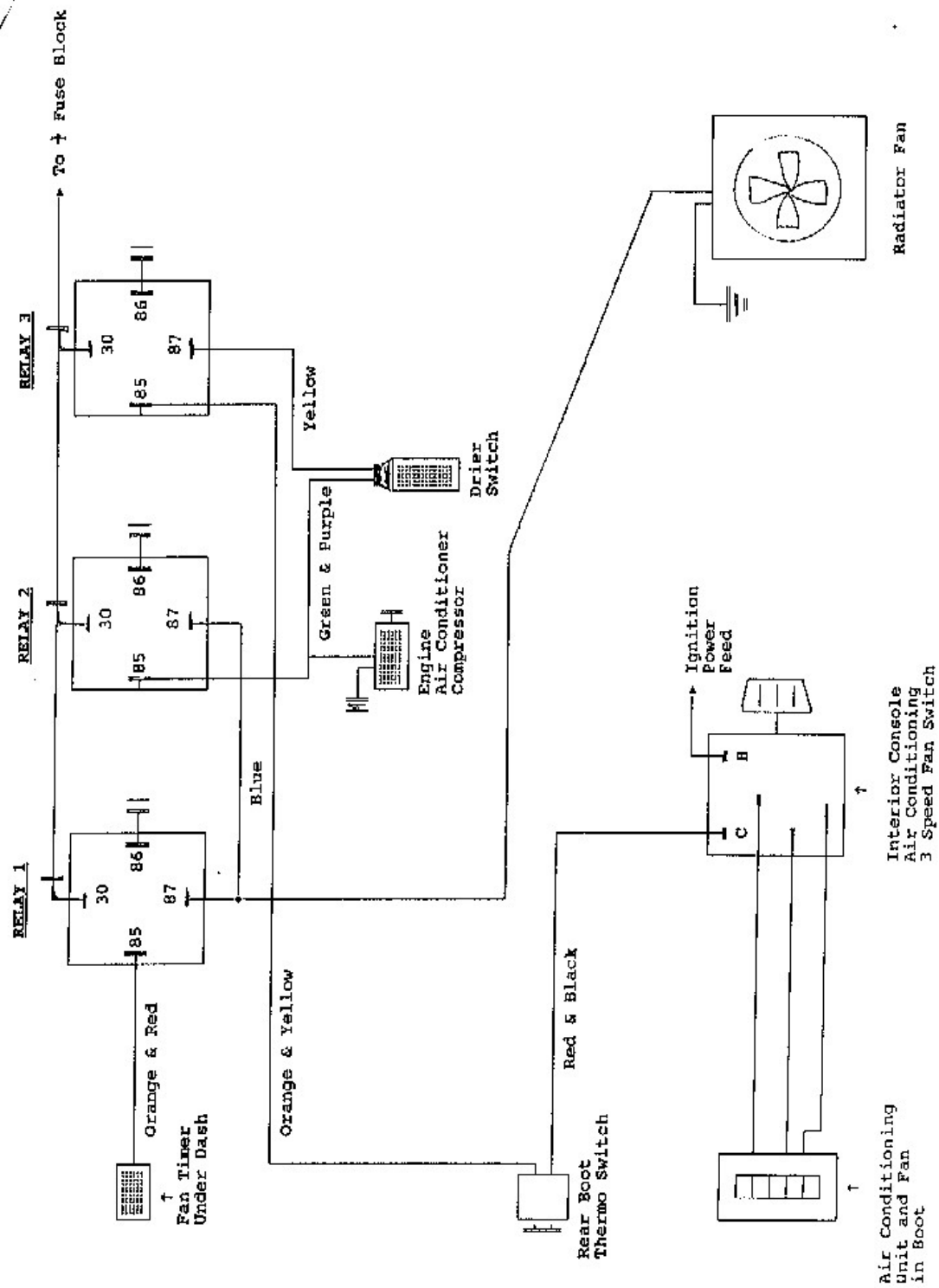


RELAY 2

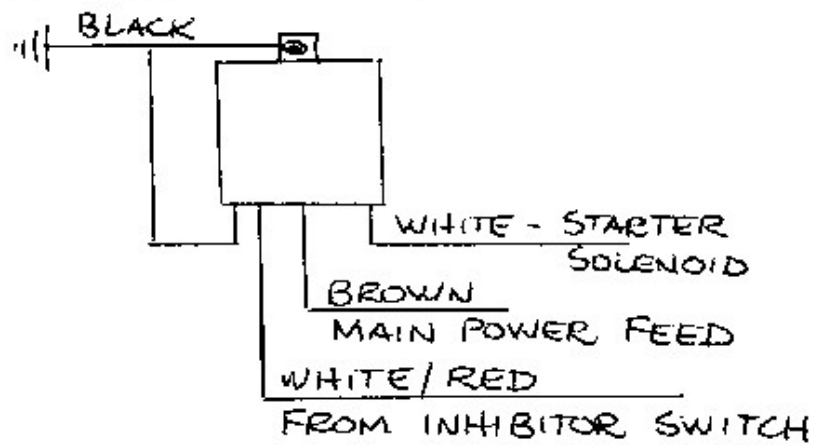


RELAY 3

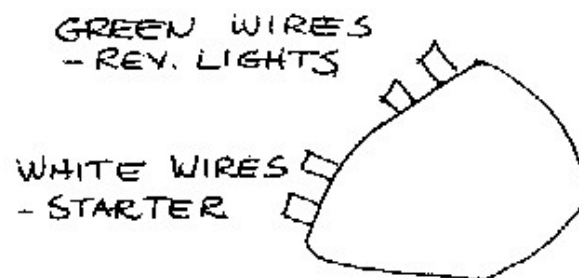


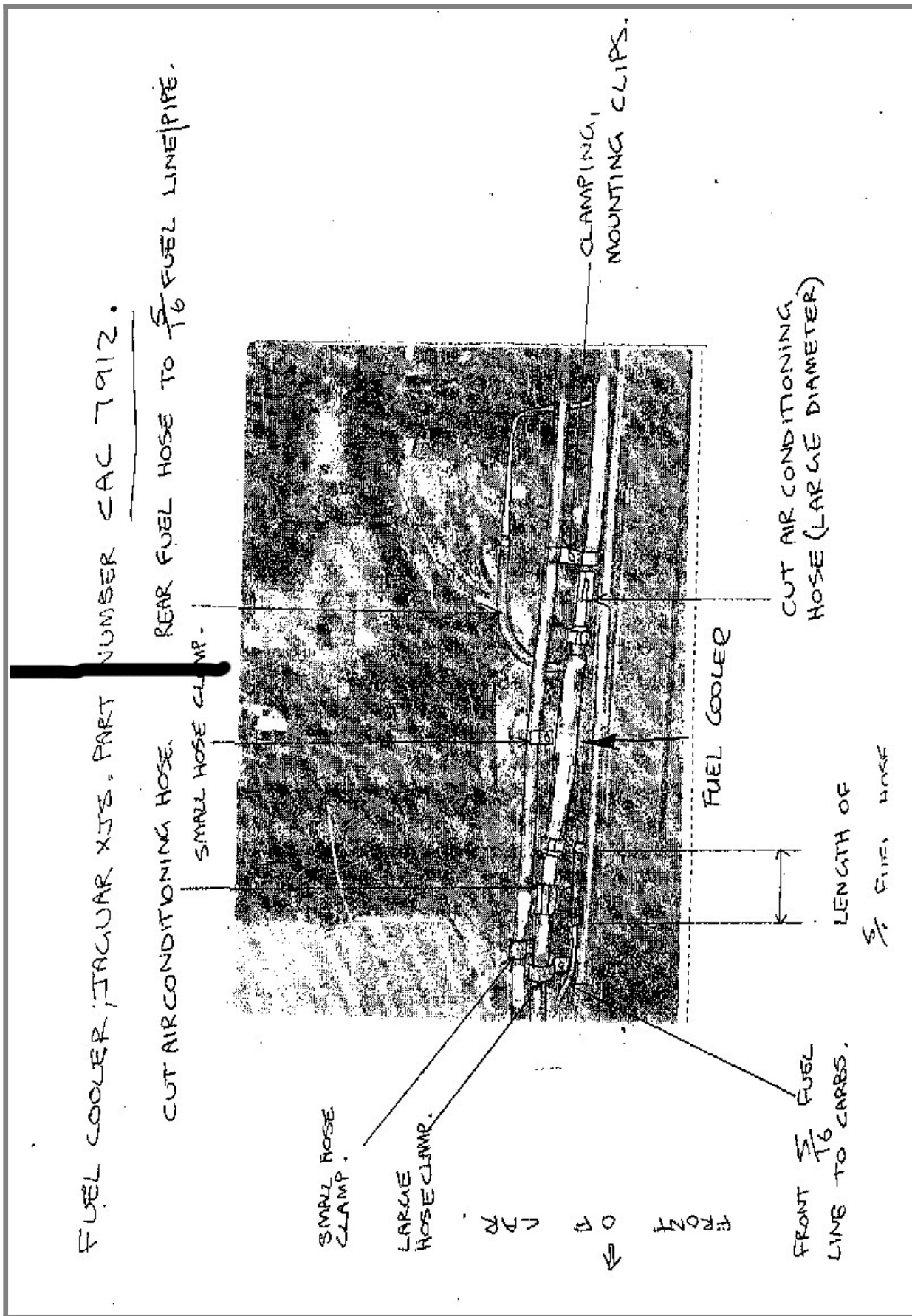


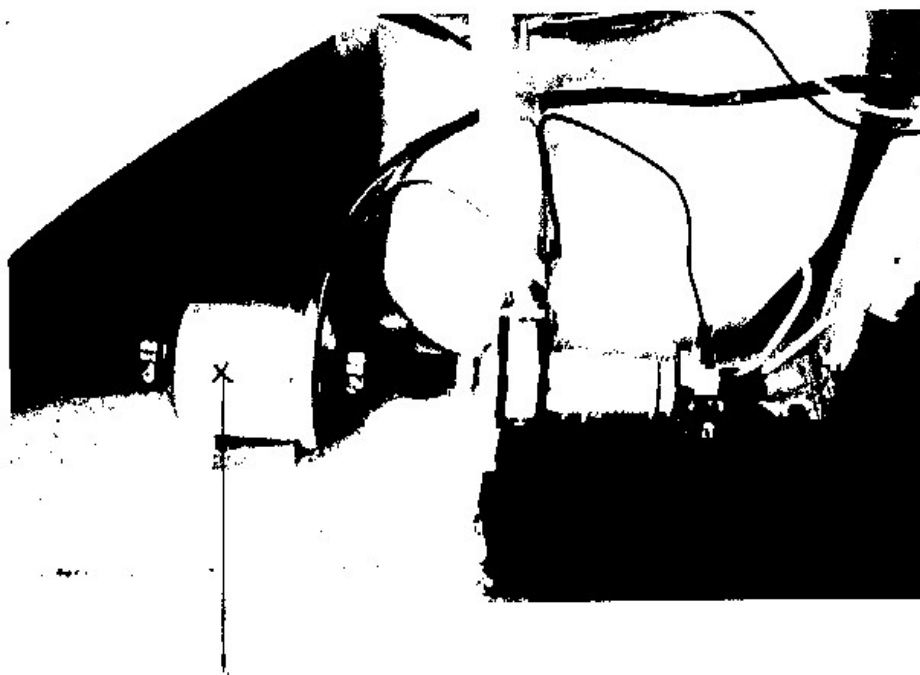
FIREWALL STARTER SWITCH



REVERSING & INHIBITOR SWITCH

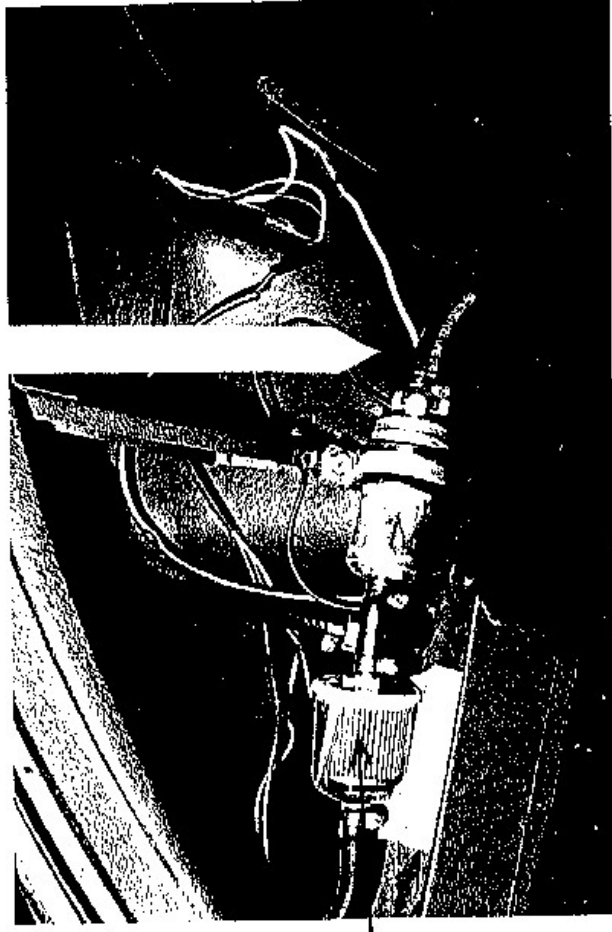






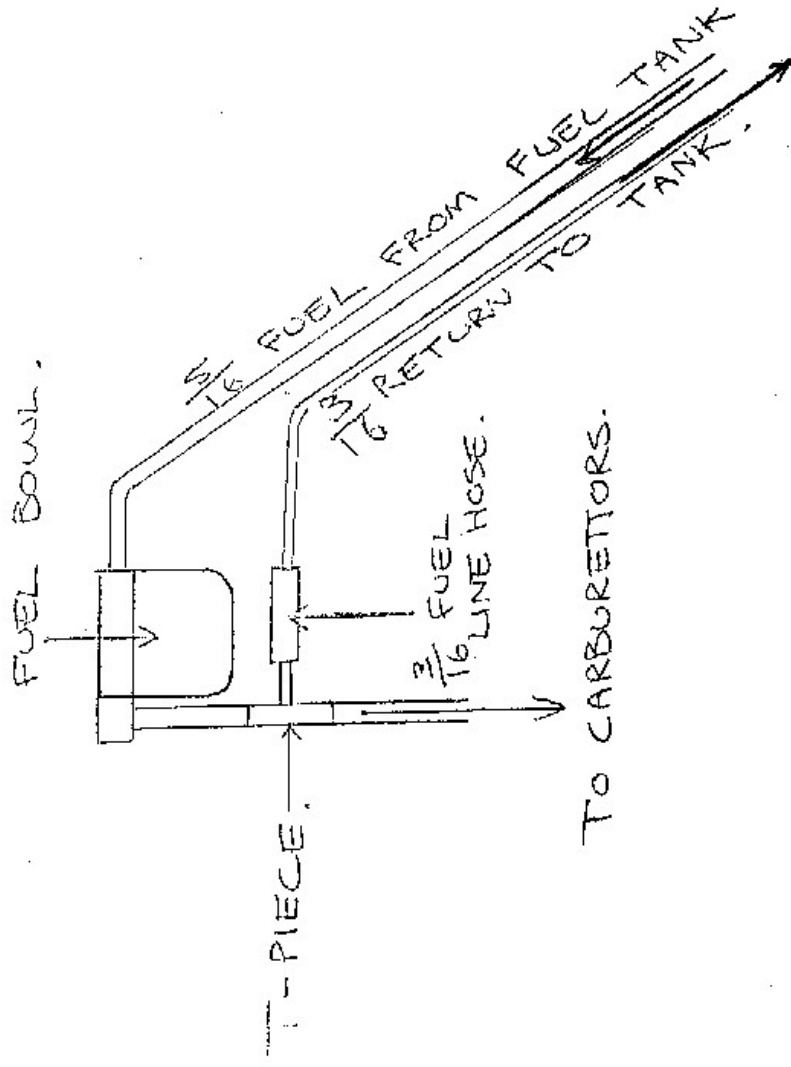
FUEL INJECTION FILTER IN BOAT L/H SIDE

MOUNT FUEL PUMP AS SHOWN, EXCEPT
REDIRECT FUEL HOSE TO CONNECT WITH
PIPE WHICH COMES UP THROUGH BOOT.



L/H INSIDE BOOT
FUEL INJECTION FILTER
NOW FITTED

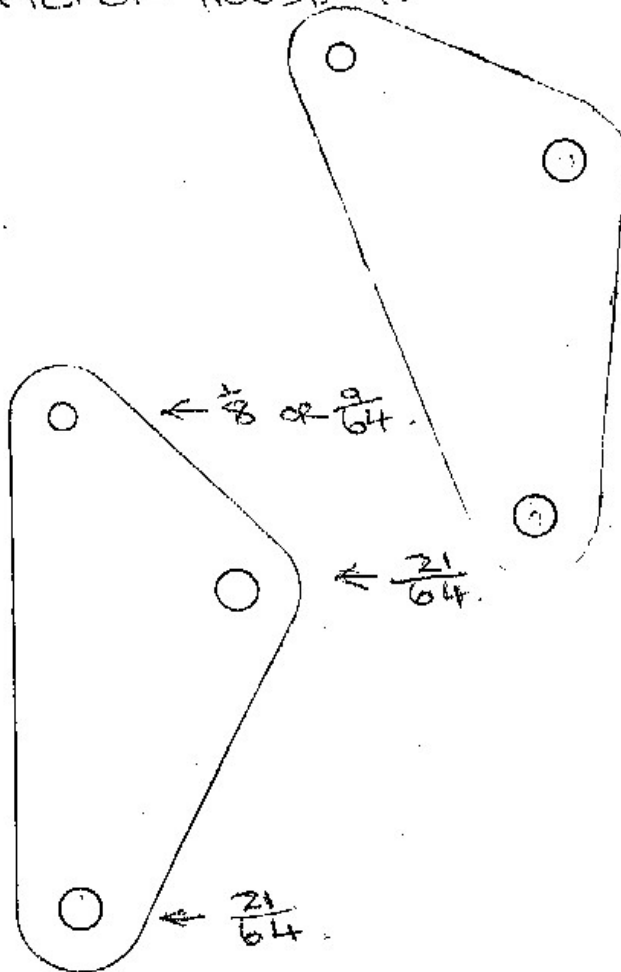
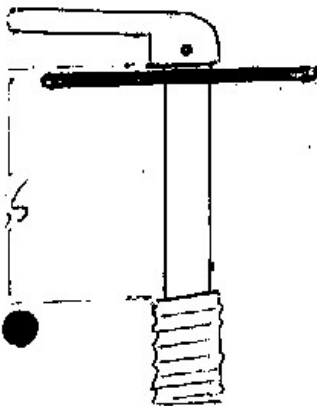
RETURN FUEL SYSTEM.



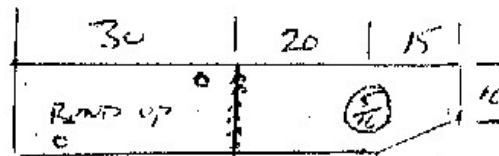
THROTTLE RETURN' SPRING BRACKET, 11.6

REQUIRED FOR ENGINES WITH UPWARD
FACING OIL FILTER HOUSING.

ARE WHEEL CLAMP
DEFICATION



INHIBITOR SWITCH
BRACKET

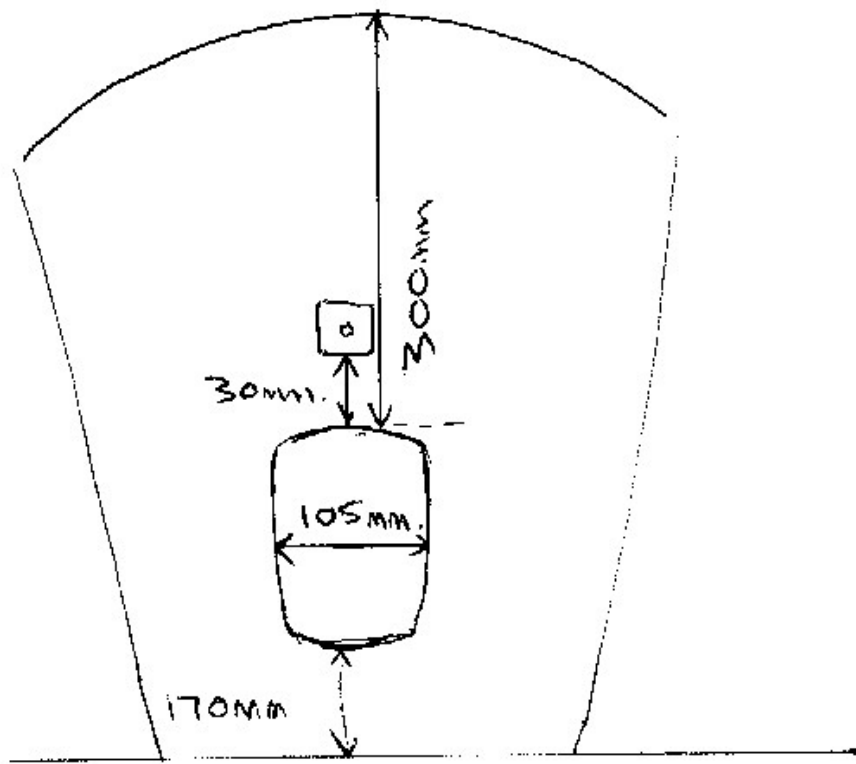


↑
MEASURE HOLE
FROM SWITCH

Manual Gearbox

4 Speed Manual O/Drive

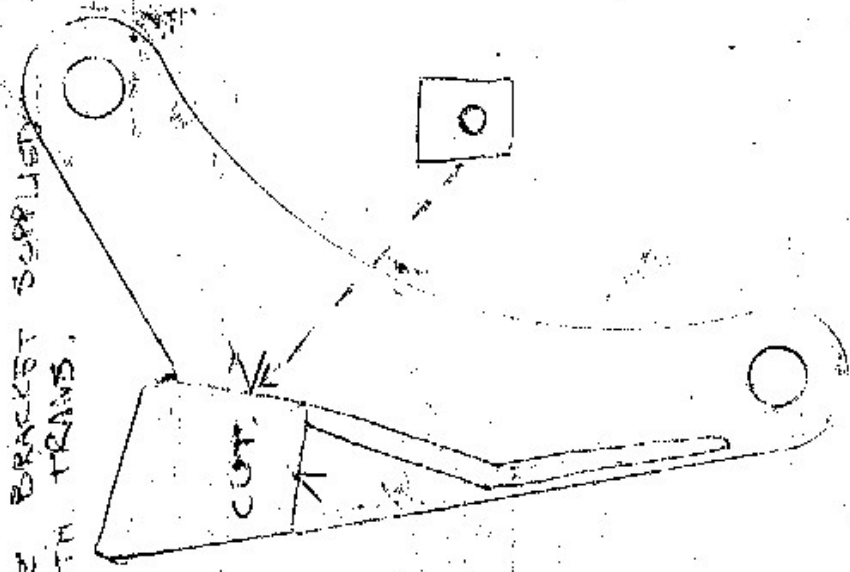
INTO AUTO TUNNEL.



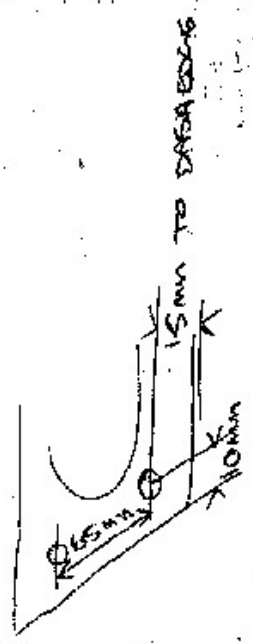
NIK 2 G/Box (same x 56) with compact O/D.

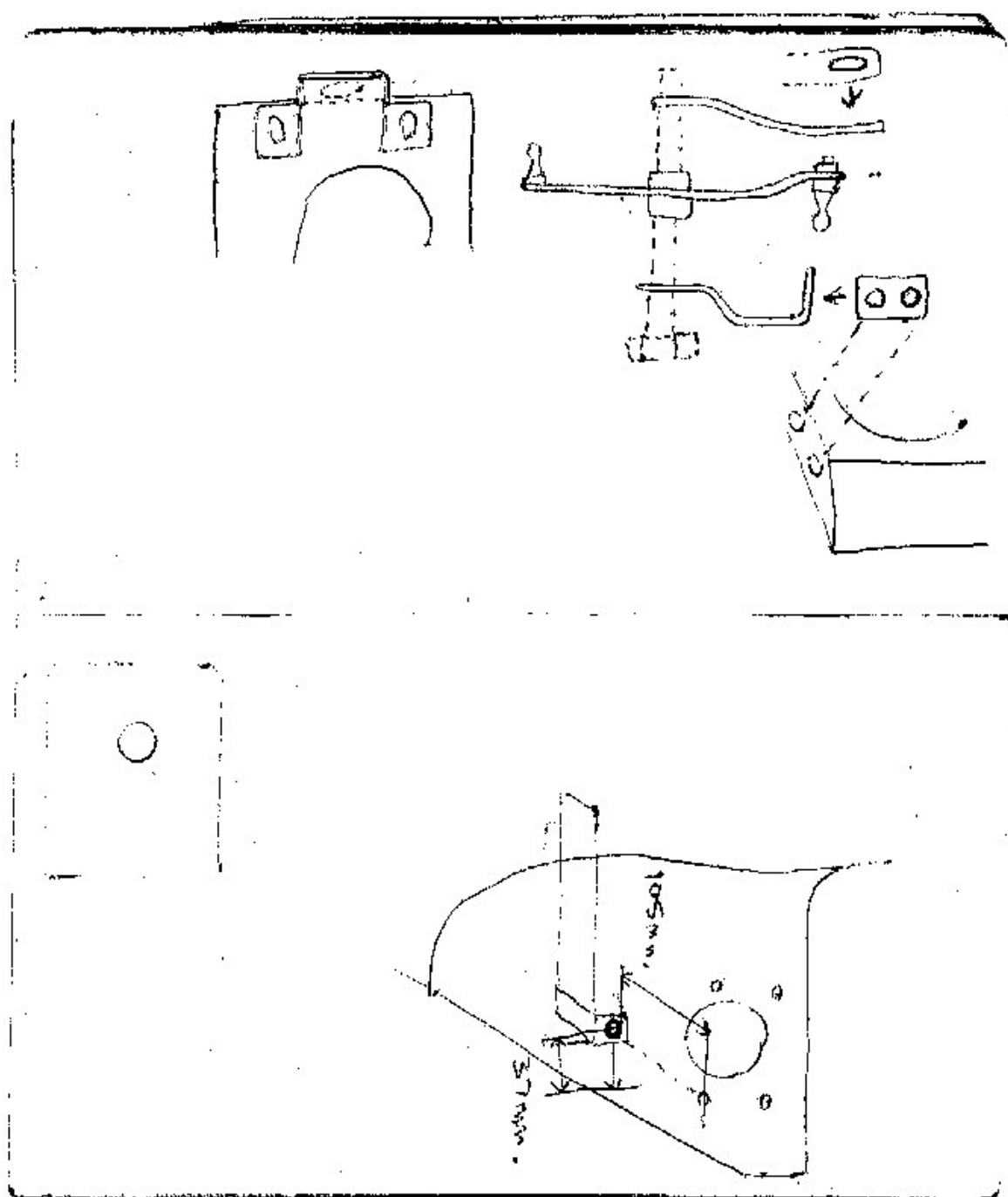
LEFT HAND DRIVE CABLE
BRACKET.

USE BRACKET SUPPLIED
WITH TRANS.



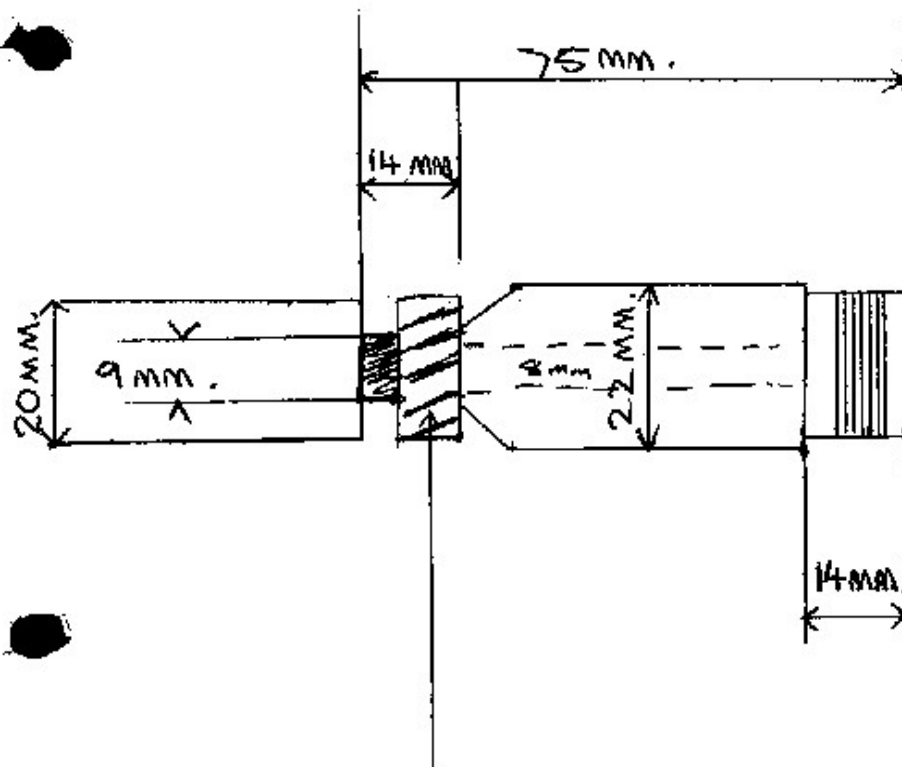
GEAR CHANGE BRACKET.



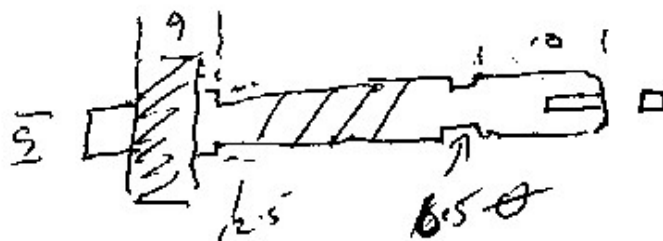


GETRAG 5 SPEED
SPEEDO DRIVE.

19 TEETH.
COLOUR = YELLOW.

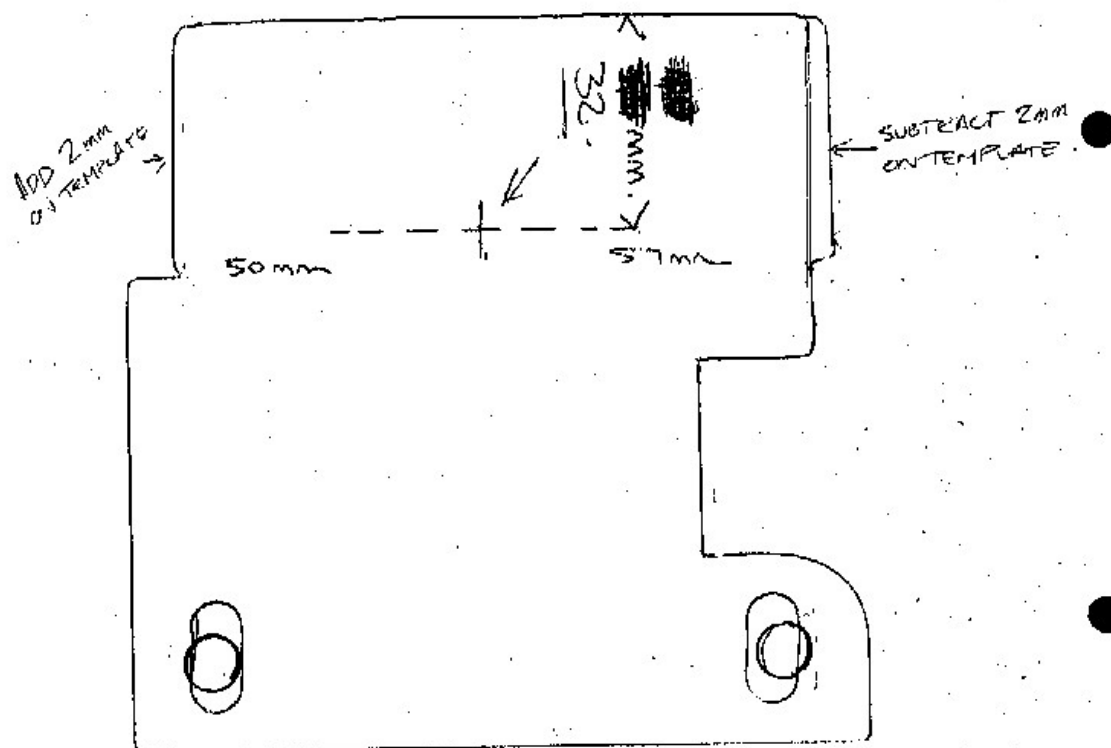


DRIVING TEETH.



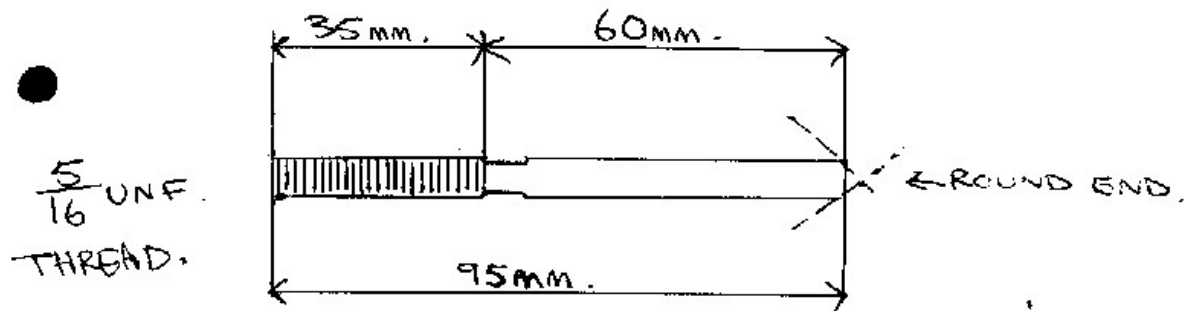
GETRAG 5 SPEED MOUNT.
3. mm PLATE.

DRILL $31/64$.
 $\frac{9}{16}$ UNF THREAD



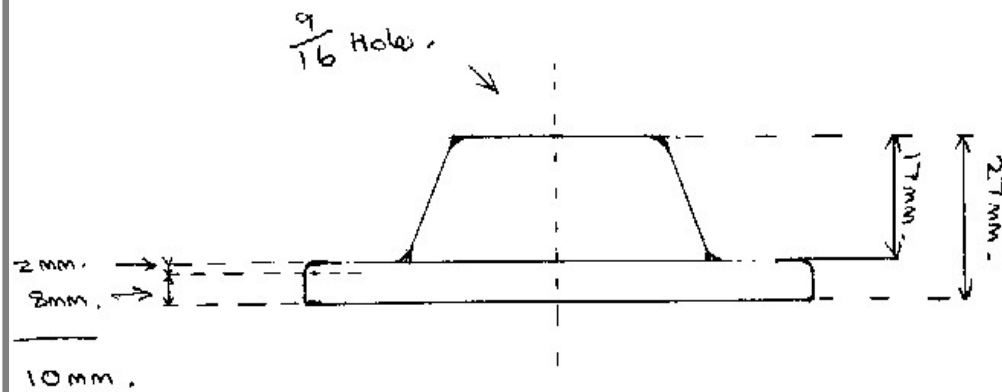
11mm

GETRAG 5 SPEED
SLAVE CYLINDER PUSH ROD.



(USE $\frac{5}{16}$ UNF X 4" OR 4 $\frac{1}{2}$ " BOLT)

GETRAG 5 SPEED.

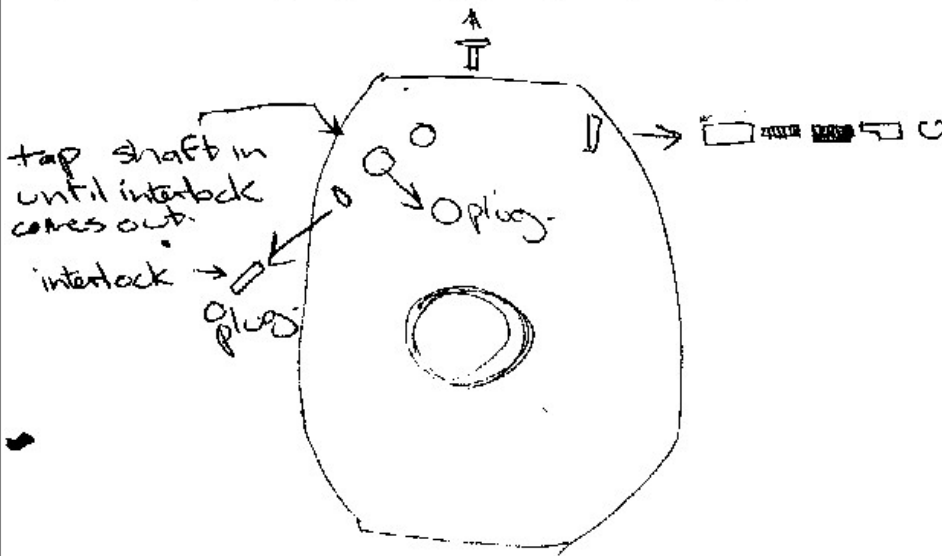


with this spring plate.
 USING 115mm A/Box mount spring, with 1x
 Rubber insulator.
 And spacing down mounting plate to chassis
 with 2x 6mm spacers per stud.

8mm

GETRAG 5 SPEED.

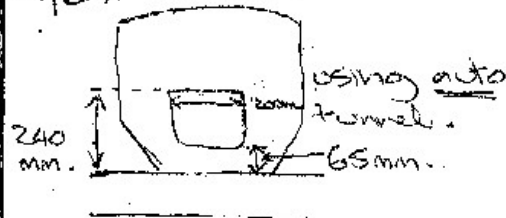
TO REMOVE TAIL HOUSING.



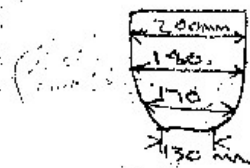
Remove speedo drive: Remove 2x bearing retainer Bolts.

* GETRACI 5-speed.
GEAR LEVER HOLE.

G/Box Tunnel.

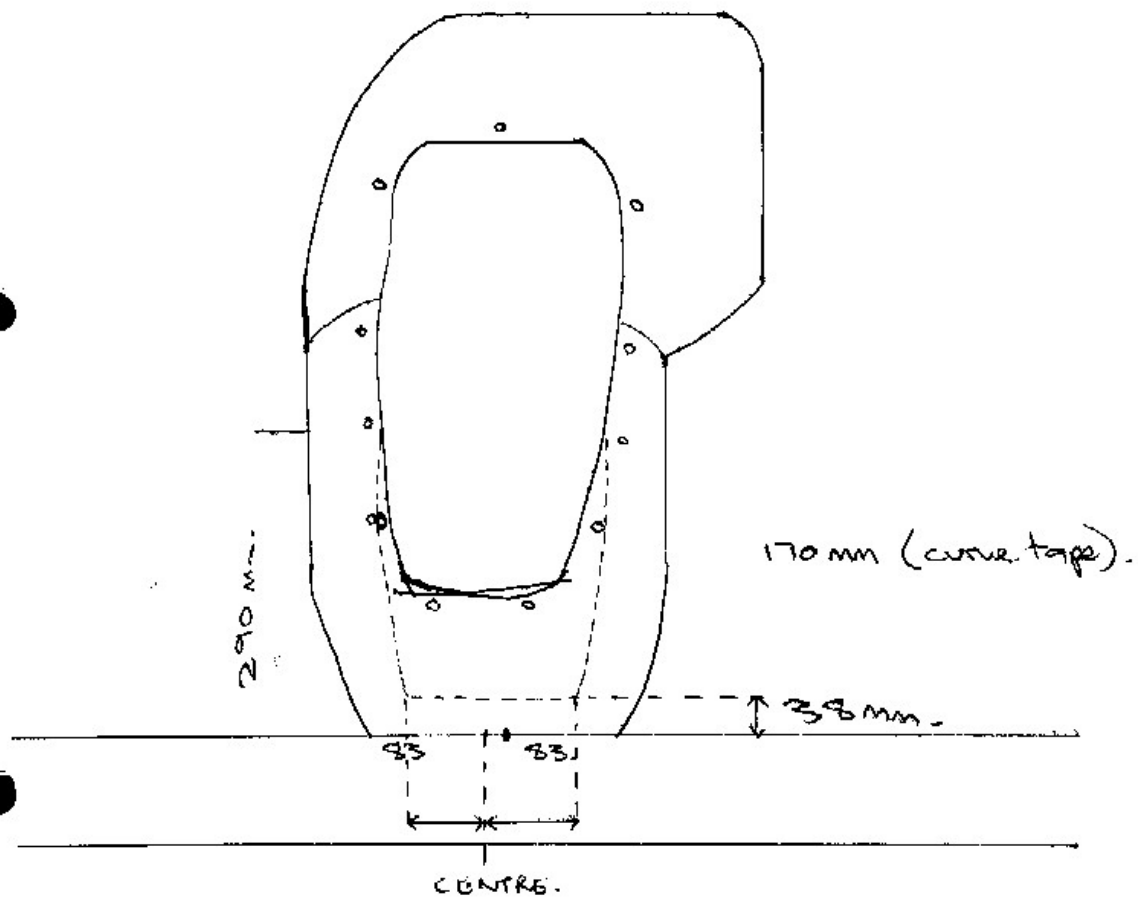


3mm.



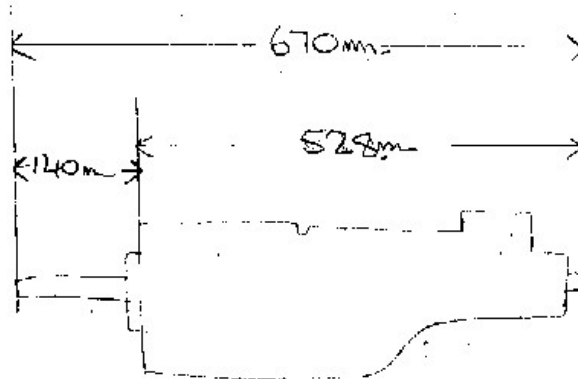
TUNNEL HOLE.

GEARBOX TUNNEL - LEVSLAND 5 SPEED.



AUTOMATIC DRIVESHAFT LENGTH 1310mm.
Levland 5 speed Driveshaft length 1283mm.

T-5, Manual 5-speed.

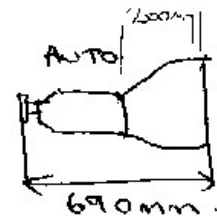
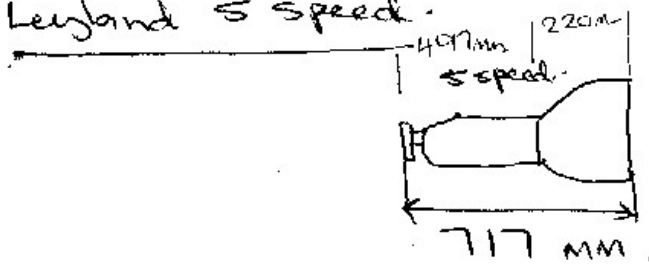


4 speed manual Jaguar -
Blasing.



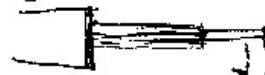
188mm.

Leighton 5 speed.



Using manual standard Flywheel.
Machine Flywheel 1mm further than position of stand
and fit an Automatic Ring gear.
Ring Gears. Flywheel. 4.5mm.
4 1mm

Input shaft and spigot.



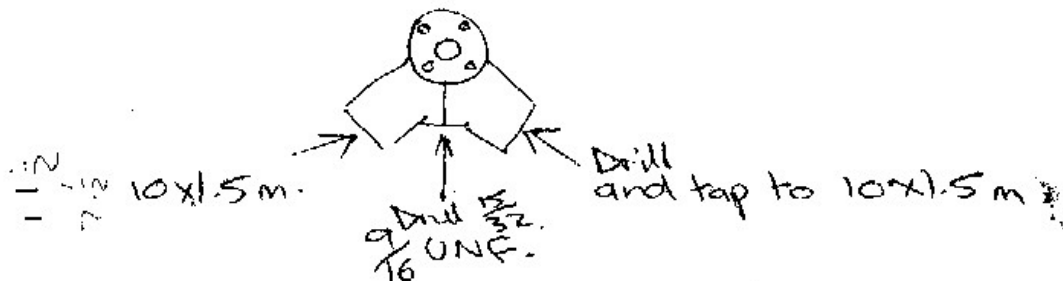
9mm only, is supported
in original spigot,
manual Flywheel.

Drive shaft.

Make 27mm shorter, using automatic driveshaft
with slip joint.

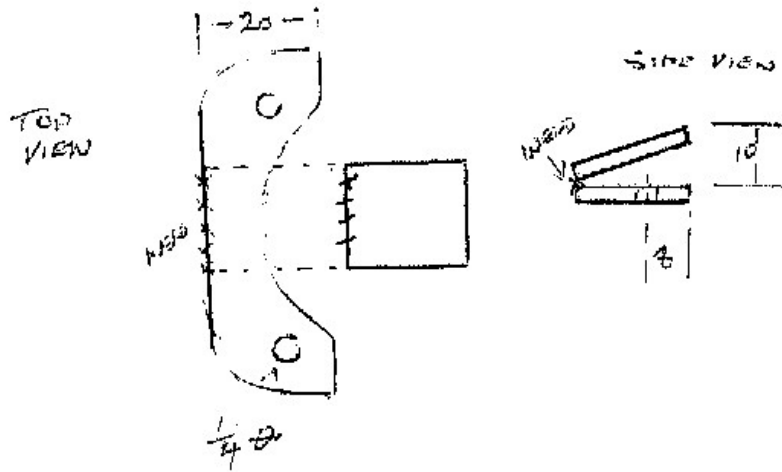
6x 12mm x 1.75 x 40mm long Shouldered Bolts.
For B housing to gearbox.

Use 2x Landrover G/Box mounts (cotton reel type)



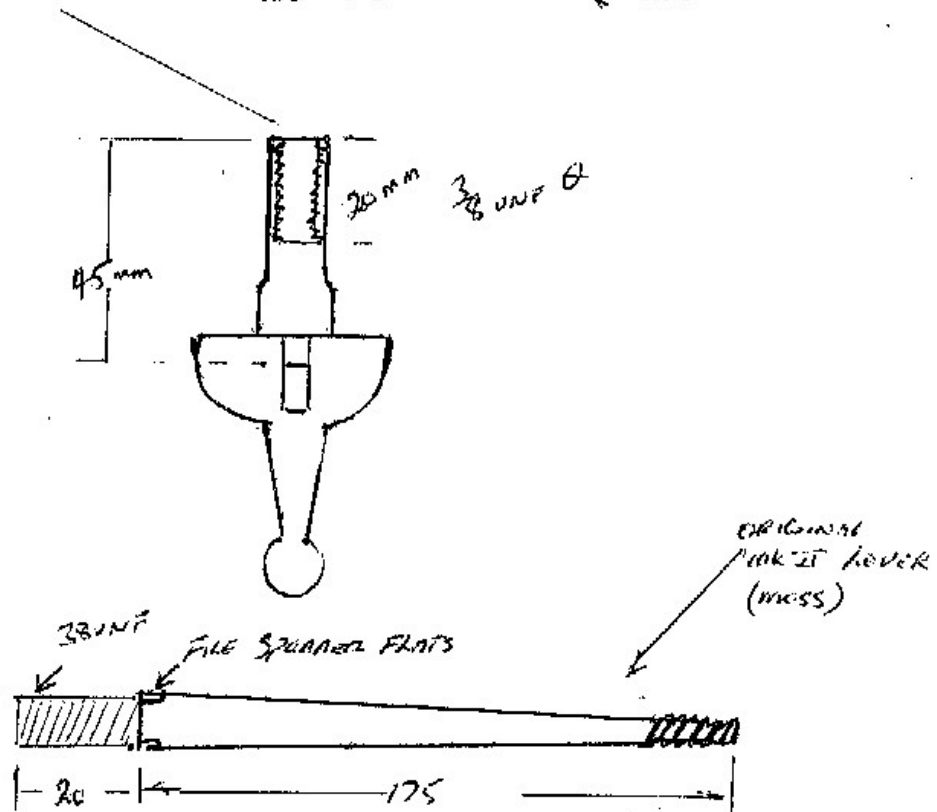
5th + Rev gear lever STOP

3mm STEEL



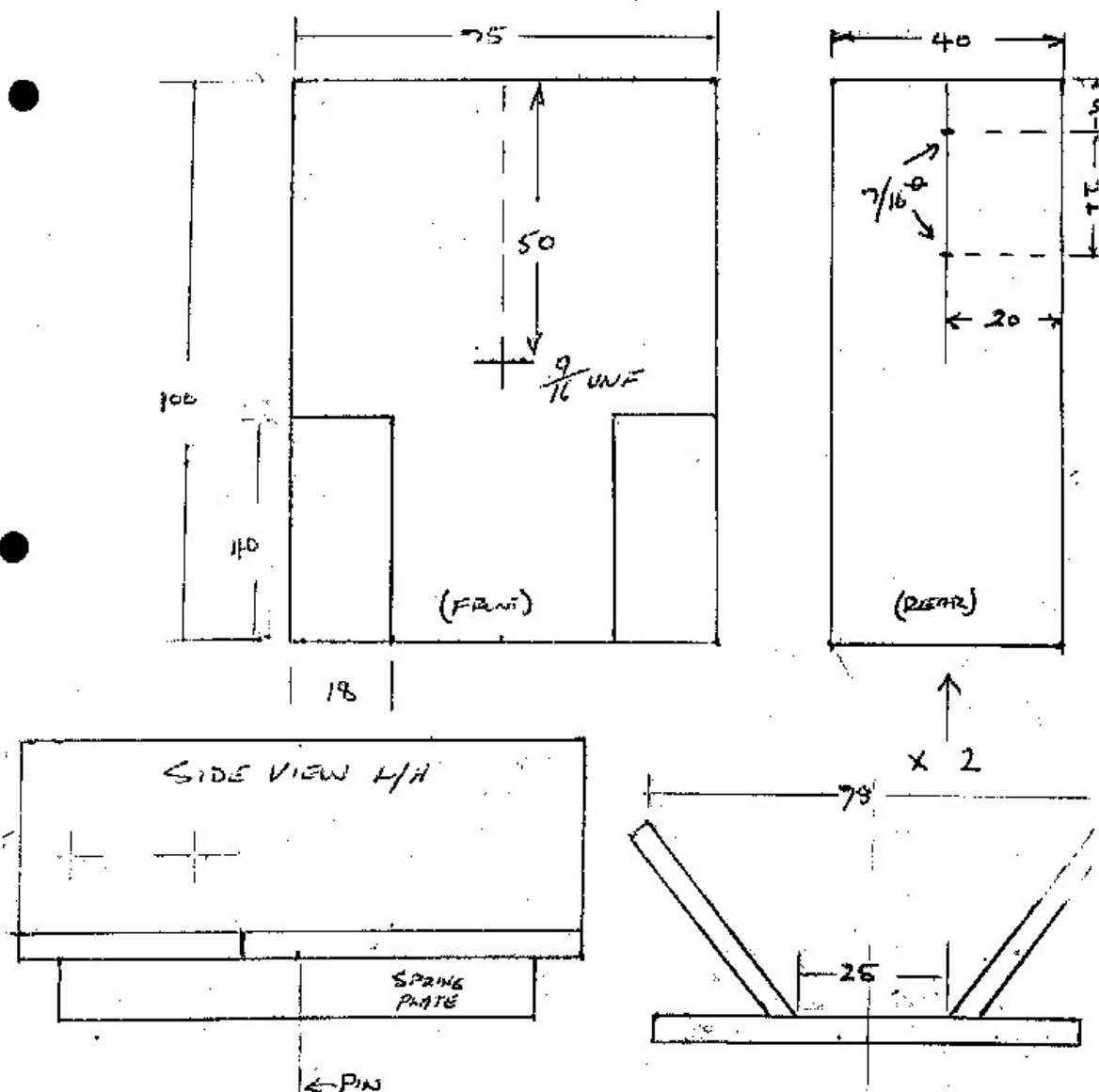
TOYOTA SUPRIYA LEVER BASE

STRAIGHTEN THIS SECTION & TAP $\frac{3}{8}$ HOLE

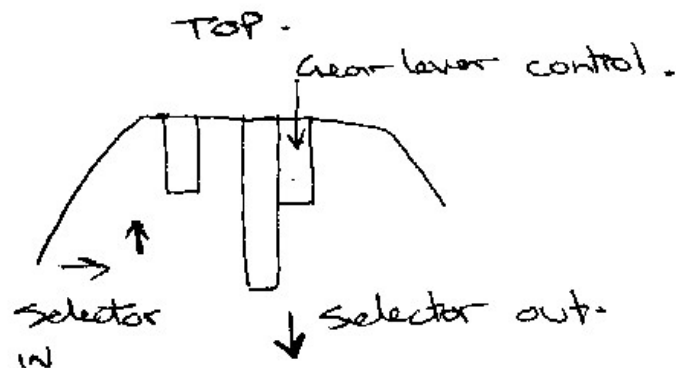



TOYOTA SUPRA
USE REAR BODY MOUNT AS PER MOD 12

- 1 x SPRING PLATE
- 1 x PIN 65mm LONG FROM PLATE
- 1 x SPRING 55 long (7.5mm coil 2) 1 x RUBBER PAD
- 4 x SPACERS - MOUNT TO BODY 25mm - $\frac{3}{8}$ " HOLE

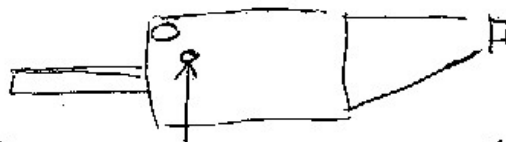


Refitting Rear tail housing.



Slide housing on until L/H selector gets to edge of inspection hole. With gear box upside down slide interlock in. ()

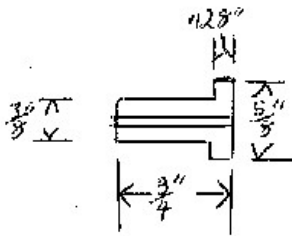
Using longer metric bolts hold Rear Bearing retainer in position until interlock is in position. Tap housing further on. The L/H selector shaft should cover interlock. One bolt at a time - Replace long bolts with original and pull housing in with bolts moving side to side. Tap rest of way and ~~tighten~~ housing.



Remove with 6mm allen key and using screwdriver slide selector shaft →. will click.

Miscellaneous

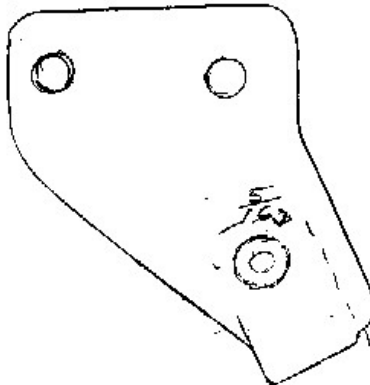
AXLE SPACER FOR P.L. DIFF.



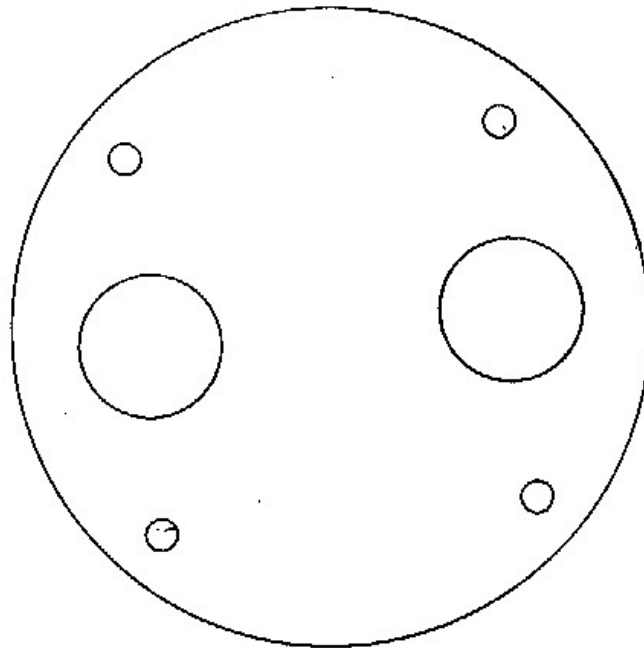
DRILL FOR $\frac{3}{8}$ " ROLL PIN

TO BE HARDENED

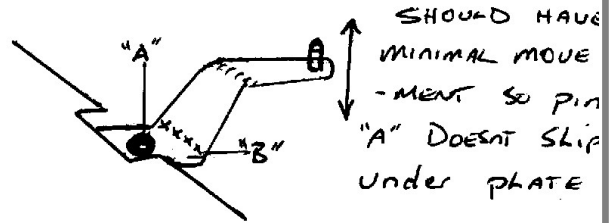
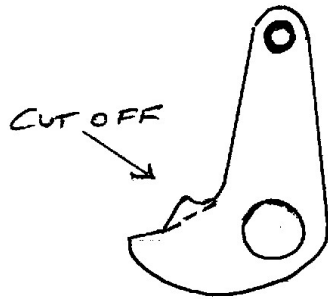
Right hand drive Auto cable



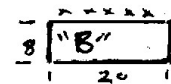
ENGINE BREATHER PLATE.
(ALUMINIUM).



CENTRAL Locking (REAR DOORS)

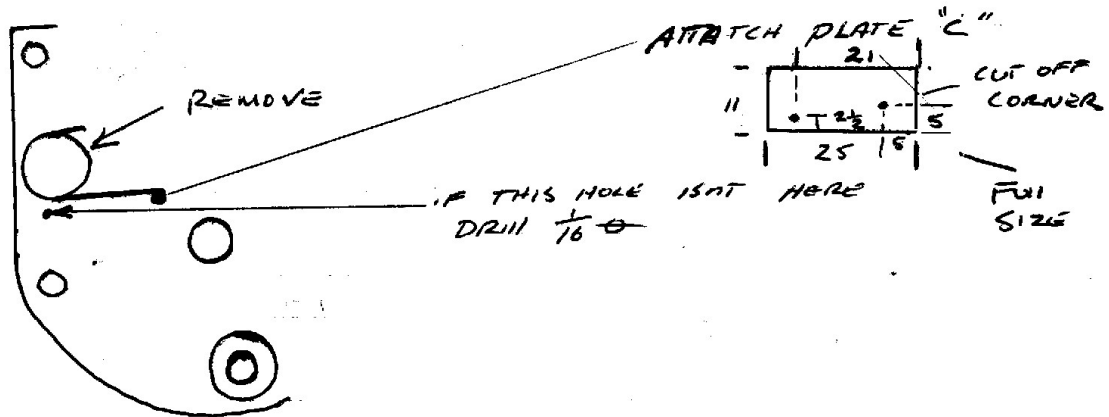


IF MOVEMENT WELD PANEL STEEL PLATE TO XXXXX



FULL SIZE

ELIMINATE ALL PLAY & LOOSE PINS
SAND BLAST, ETCH, PAINT



FIT SPRING AND PLATE "C". WELD BOTTOM EDGE ONLY
* BEFORE WELD SET UP TO OPERATE AS FRONT LOCKS DO

DIFF MODIFICATIONS

RATIO 46/14 order Crownwheel Pinion CARRIER

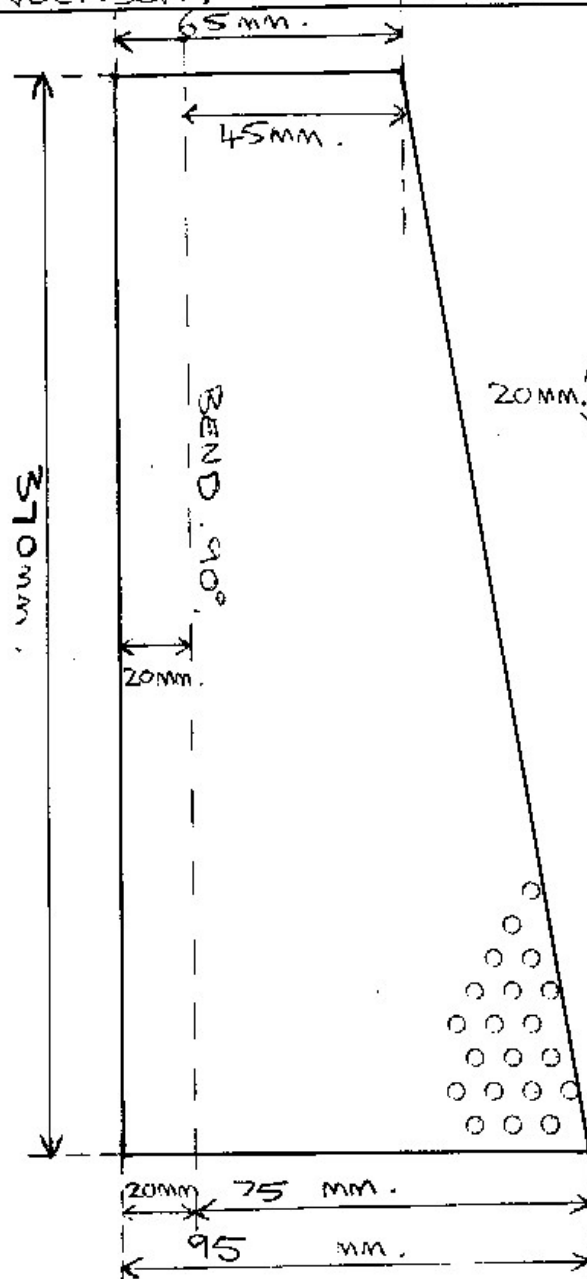
MACHINE Pinion + USE COLLAPSABLE SPACER

P/N° 12456 ← 5A6

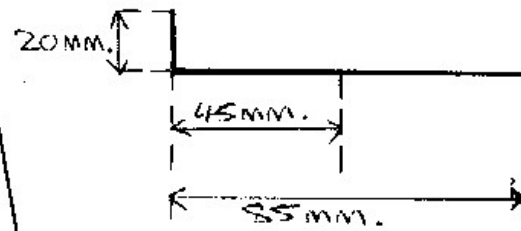
TOYOTA 5 speed REAR TAIL SHAFT SEAL

P/N° C2-28-04-13 04332-30020

STONE GUARD FOR CNSOII AIR/CON CONDENSOR.

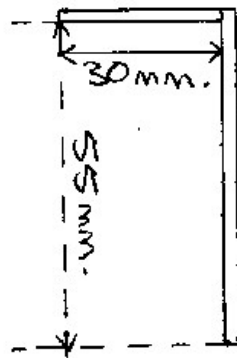


BEND EDGE THIS
WAY.



END VIEW.

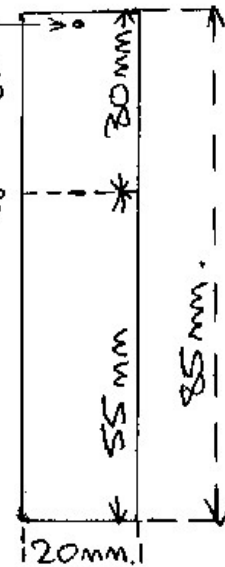
LEFT HAND DRIVE. - WASHER BOTTLE / POWER STEER
SUPPORT - BRACKET.



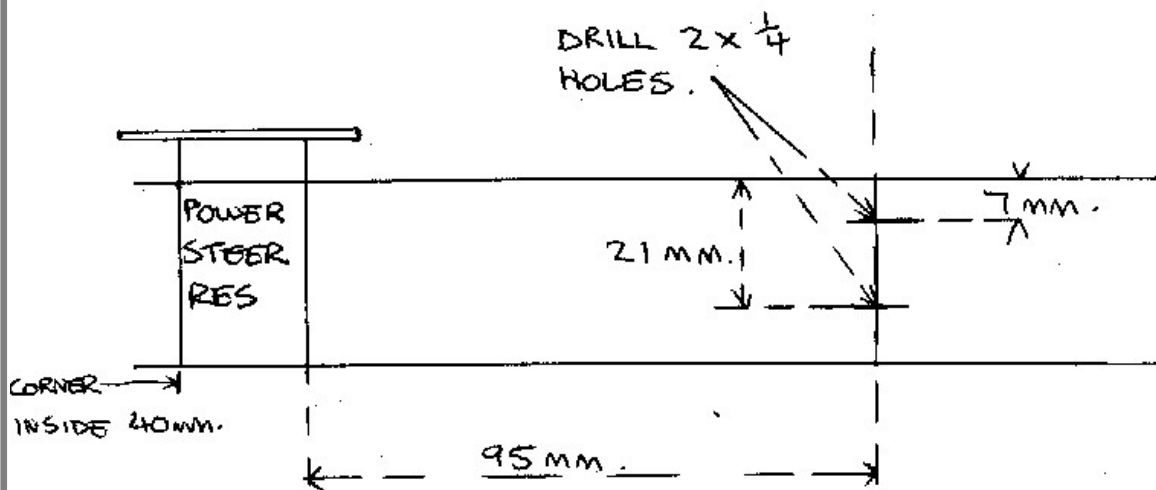
USING 20mm x 3m.

DRILL $\frac{3}{32}$
{ ONLY USED FOR
PRINTING }

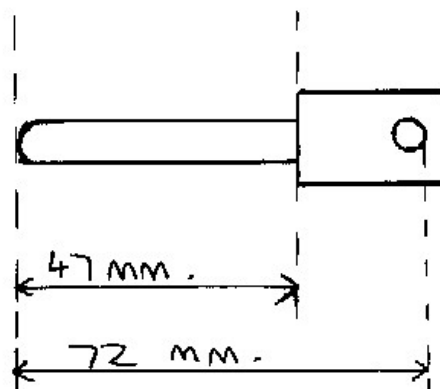
BEND 90°



L/H Drive - MOUNTING WASHER BOTTLE ON BATTERY
STRAP.



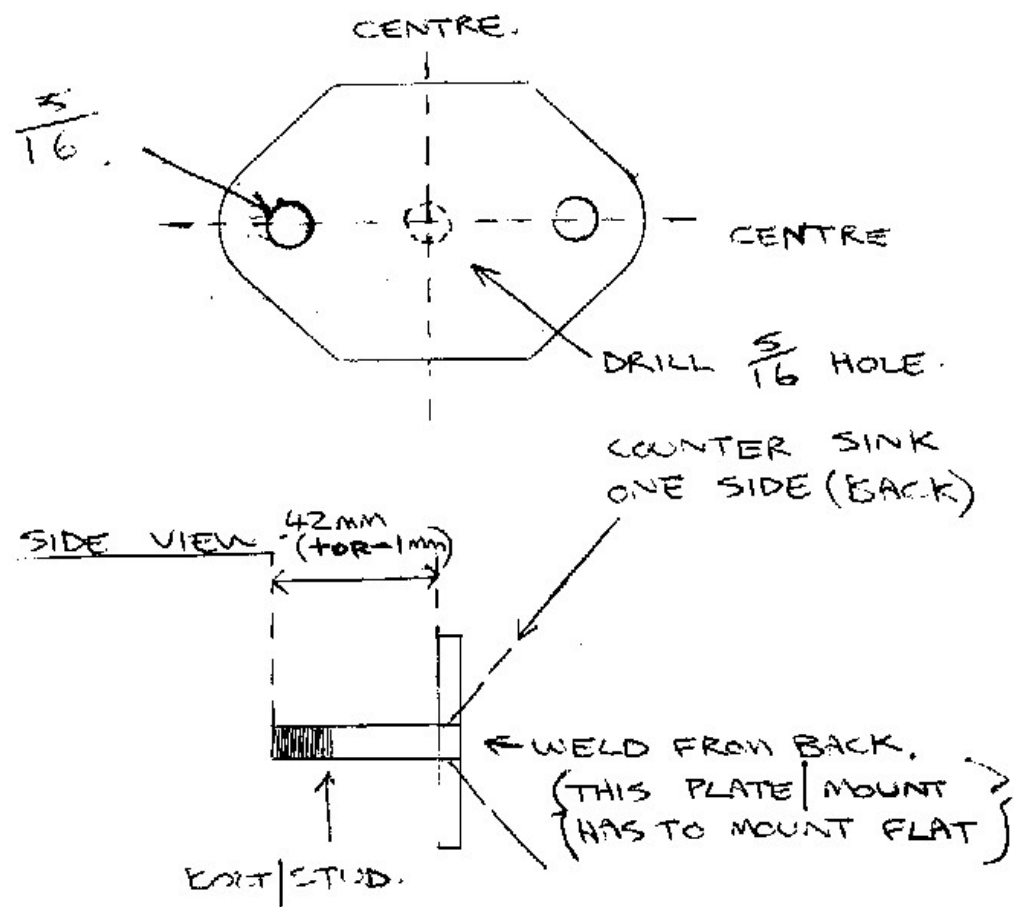
BRAKE MASTER CYLINDER PUSH ROD.
(Replacement to use in place of spacer).



FRONT MUFFLER MOUNT.
(USING -AUTOGEN RUBBER Y-CSM97.)

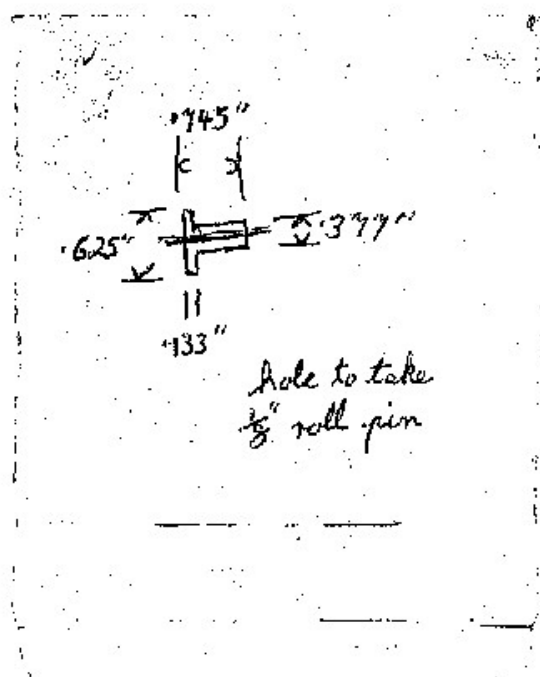
* USE OLD TYPE EXHAUST MOUNTS AND REMOVE OLD RUBBER.

USE 1x $\frac{5}{16}$ x 2" BOLT UNF. (CUT BOLT HEAD OFF)



- ONE MOUNT REQUIRED PER CAR.
- PROVIDED A SOFTER MOUNT EXHAUST WITH LESS HARSHNESS AND VIBRATION.

TWO REQUIRED PER POWERLOCK DIFF



The system incorporates four major advances in anti-corrosion technology.

This wax blend offers high penetration and water displacing qualities with little or no preparation required. The Wax Blend is also low in permeability and extremely durable, giving superior anti-corrosion protection in arduous conditions and protecting steel even through movement or impact. Easy application, low toxicity and high-build mean maximum efficiency and protection without the need for specialist applicators or equipment.

Corroless Corrosion Inhibitors (CI) work by producing a vapour which forms a mono-molecular layer on contact with steel. This layer excludes oxygen from the surface, and interrupts the electrolytic process of corrosion. On application in enclosed areas the CI component in the Wax System produces vapours which reach and protect cavities, seams and crevices which the wax itself cannot reach.

Corroless Pigment will stabilise rust into a firmly bonded layer of stable black iron oxide. This protective layer minimises the risk of rust creep and ensures effective, long-term corrosion protection. Corroless Pigment has been incorporated into the priming components of the Wax System.

This tough glass barrier comprises millions of heat hardened glass flakes which self-leaf within the coating to form a virtually impermeable layer of glass. The barrier gives the Wax System exceptional moisture and corrosion resistance.

The System comprises three products to give maximum protection with minimum preparation even in the most demanding environments.



A highly penetrating rust stabilising fluid which encapsulates rust and forms a protective film of wax. Its searching properties ensure that moisture is dispelled from even deeply pitted rust and crevices. Contains High Performance Wax Blend, Corroless CI and Rust Stabilising Pigment.



Made from high quality synthetic waxes blended with polypropylene, this coating forms a firm layer of protective wax. For use on severely rusted areas where maximum anti-corrosion protection is required. Contains High Performance Wax Blend, Corroless CI and Rust Stabilising Pigment.

A tough but flexible Wax Finish in a range of attractive colours giving an exceptional standard of protection and decoration. Contains High Performance Wax Blend, Corroless CI's and Self Leafing Glassflake.

Corroless Wax Systems successfully provide corrosion protection for a wide range of applications where only minimal preparation is possible. The total solution may also require effective control of substrate corrosion and protection against external factors such as water, chemicals, salt and pollution. This is achieved by the use of further Corroless International technologies such as Corroless Corrosion Inhibitors and Corroguard Reinforced Rust Stabilisers.

Corroless International provides a wide range of complementary products, systems and services to combat corrosion, in over 40 countries worldwide.

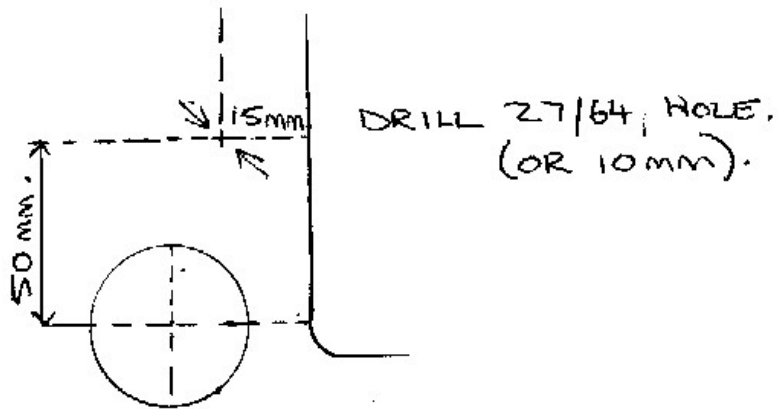


Corroless Australia, 'Corroless House', 30 Brown Street, East Perth, Western Australia 6004. Telephone: (09) 325 3251 International: +619 325 3251
Facsimile No: (09) 325 6543 International: +619 325 6543

CORROLESS IS A TRADE MARK OF CORROLESS INTERNATIONAL LIMITED

DESIGNED & PRODUCED BY DANIEL WEST ASSOCIATES LTD. LONDON

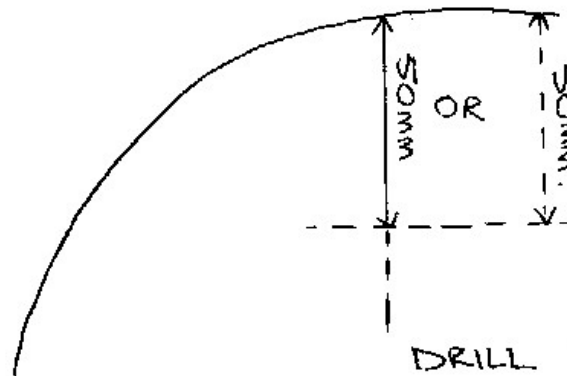
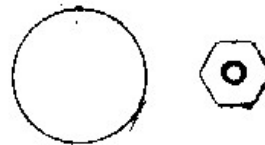
ENGINE BAY - FIREWALL.



AUTO GEARBOX TUNNEL.



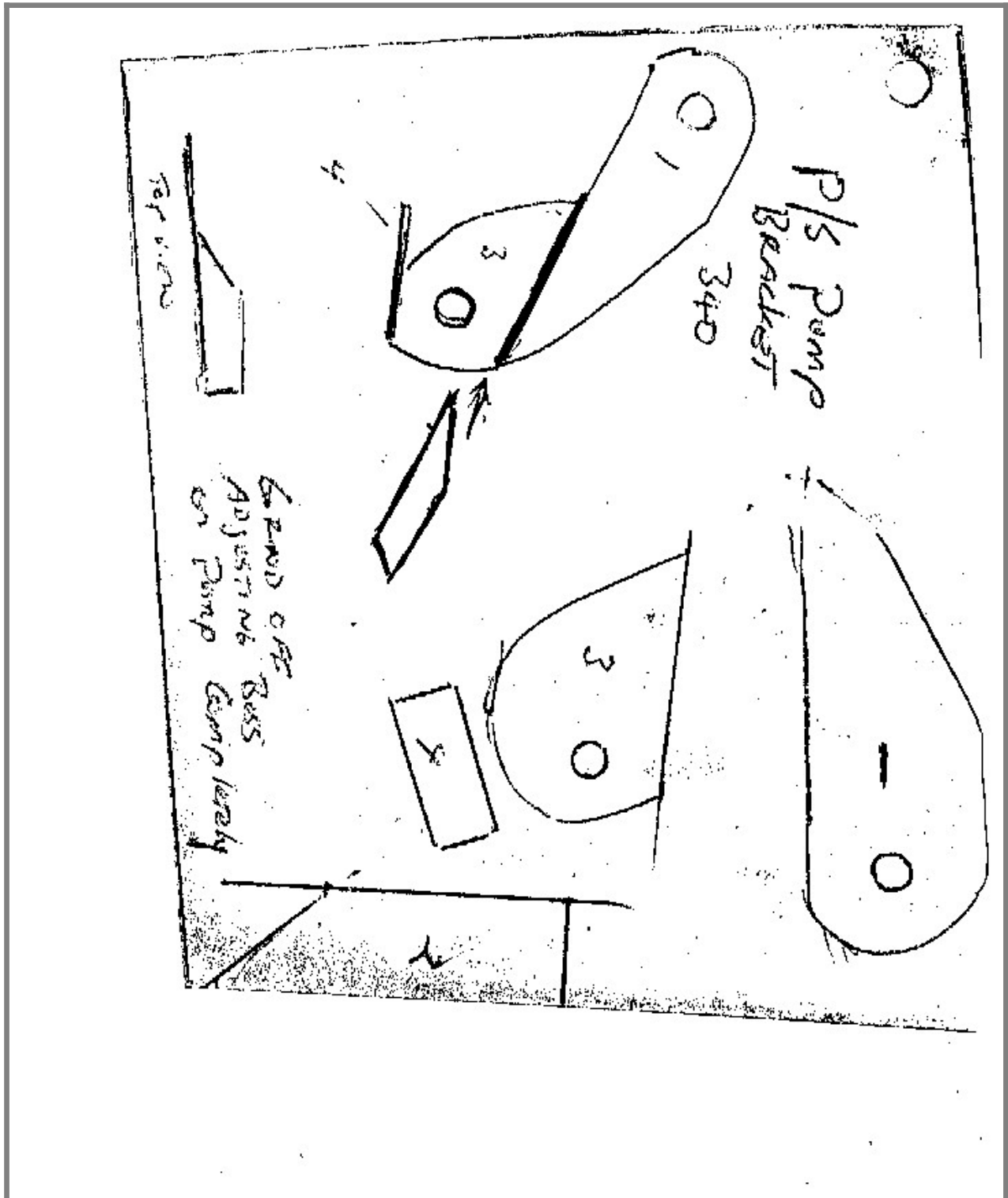
MEASURE BELOW
HOLE ON FIREWALL
OR BELOW NOT ON
FIREWALL, WHICH IS
TO OUTSIDE.



*
MEASURE HERE
IF THERE IS
NO HOLE.

DRILL 27/64 HOLE
(OR 10 mm).

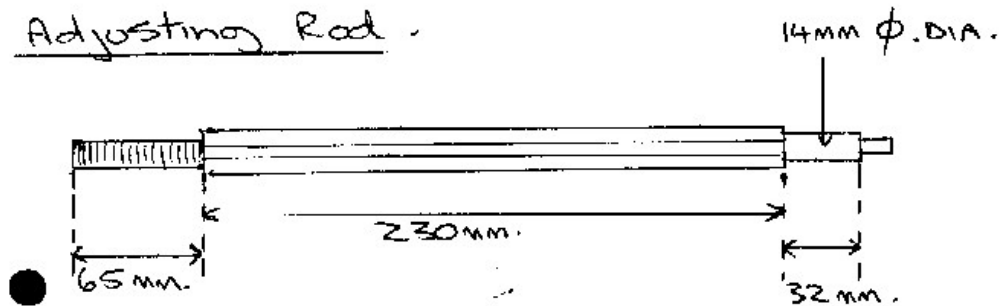
Power Steering, Air and Alternator



340 POWER STEERING.

USE DAYCO 15340 - made in U.S.A. V-BELT.

Adjusting Rod.



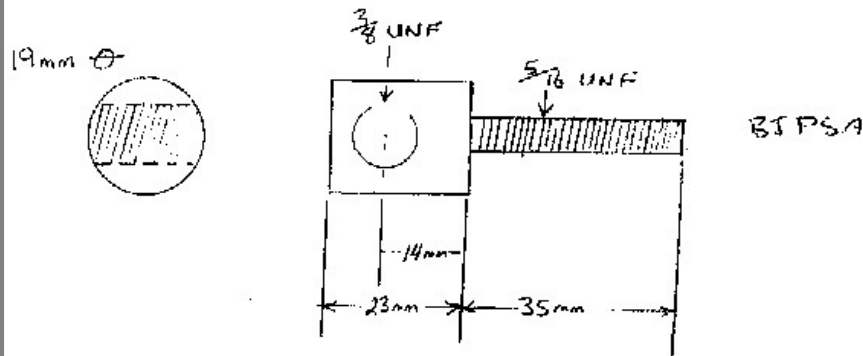
MACHINE DOWN STANDARD MKII ROD.

MORE CLEARANCE IS REQUIRED FOR P/STEERING PUMP.

RIGHT FRONT INNER GUARD ABOVE BRAKE BOOSTER AREA NEEDS HOLLOWING.

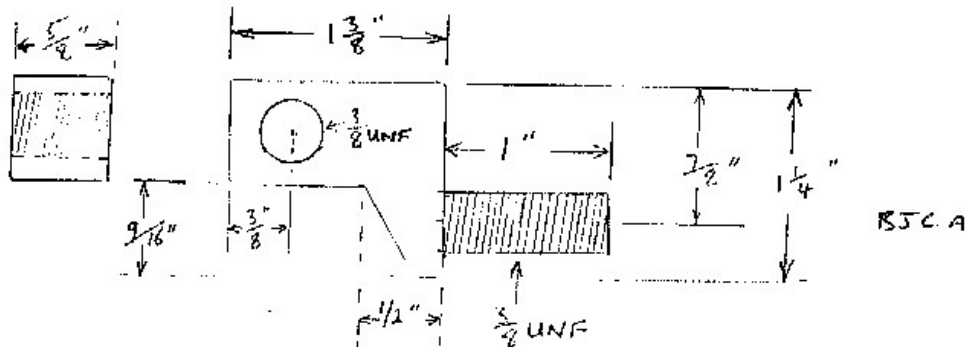
P/SILKING PUMP TOP ADJUSTING BRACKET

(5)

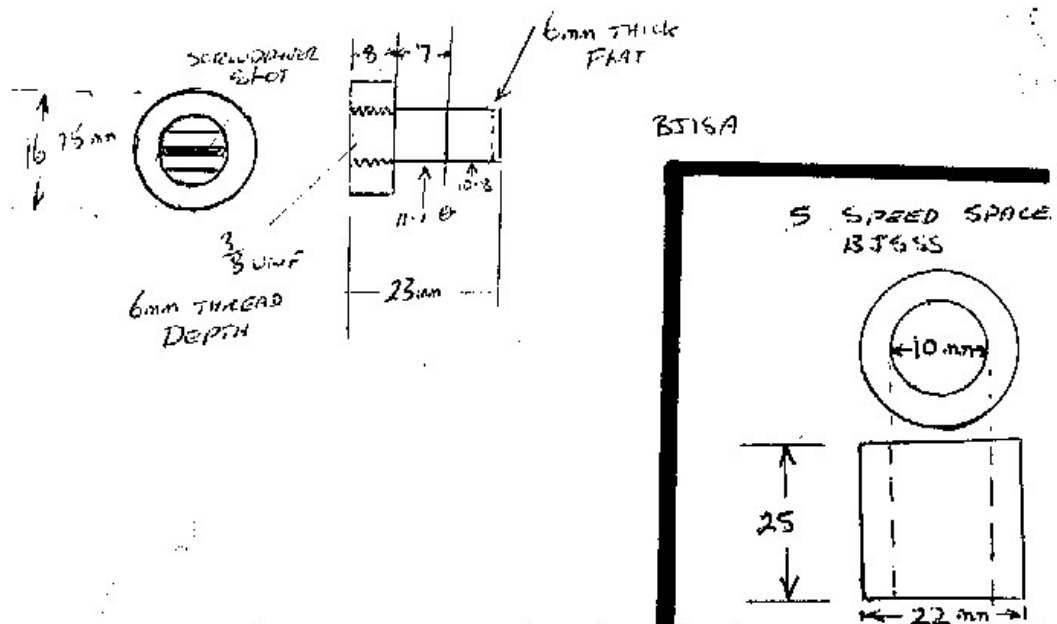


COMP' ROD ADJUSTING BRACKET

(6)



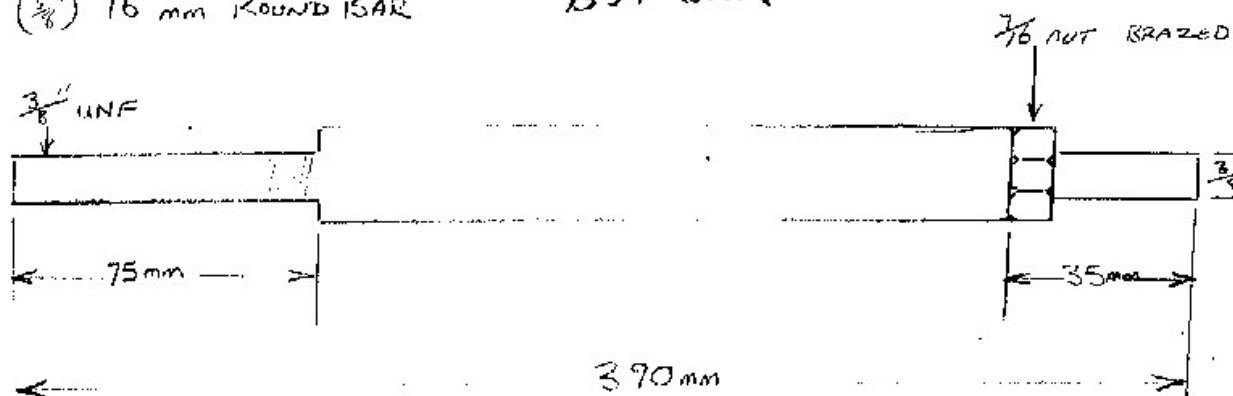
INHIBITOR SWITCH ADAPTOR



P / STEERING ADJUSTING ROD

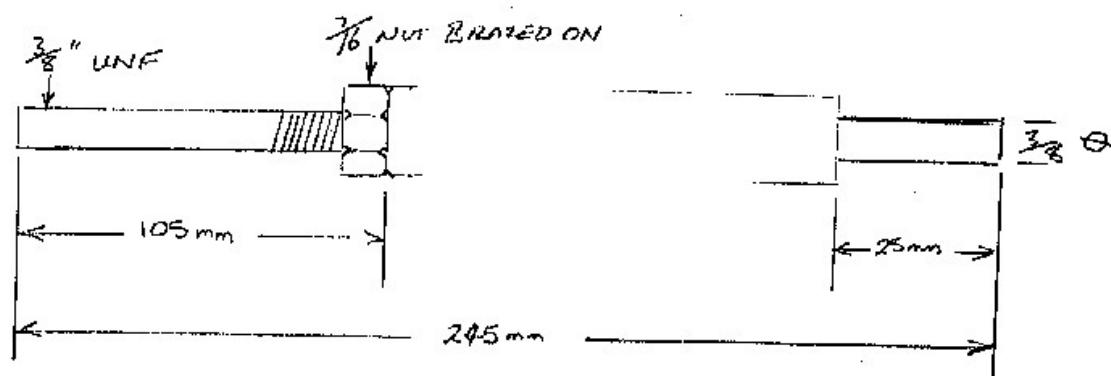
($\frac{5}{8}$ ") 16 mm ROUND BAR

BTP SAR



ALTERNATOR ADJUSTING ROD

($\frac{5}{8}$ ") 16 mm ROUND BAR

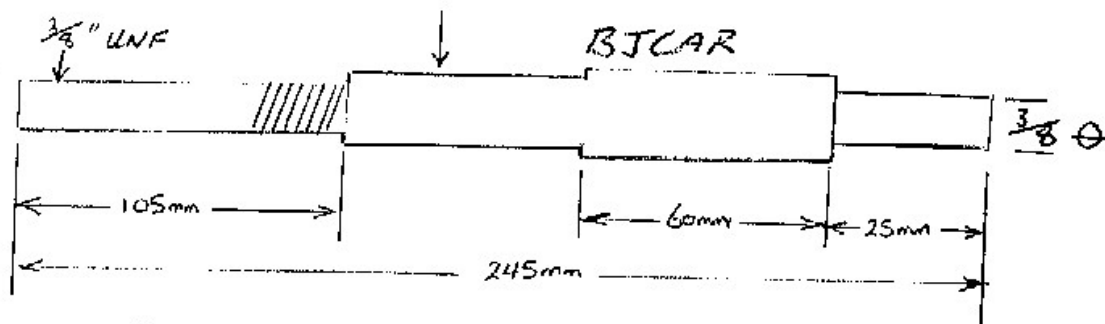


AIR. CON. COMP. ADJUSTING ROD

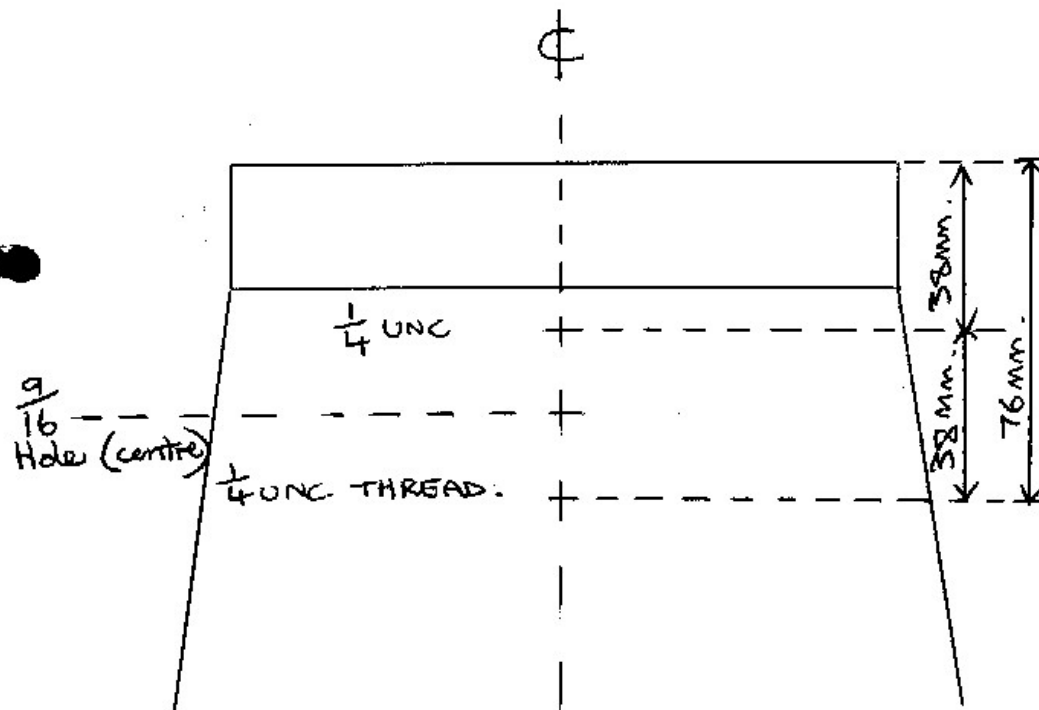
($\frac{5}{8}$ ") 16 mm ROUND BAR

MAKE INT. & COMPRESSOR
SAME AS BELOW

REDUCE TO $\frac{1}{2}$ Ø

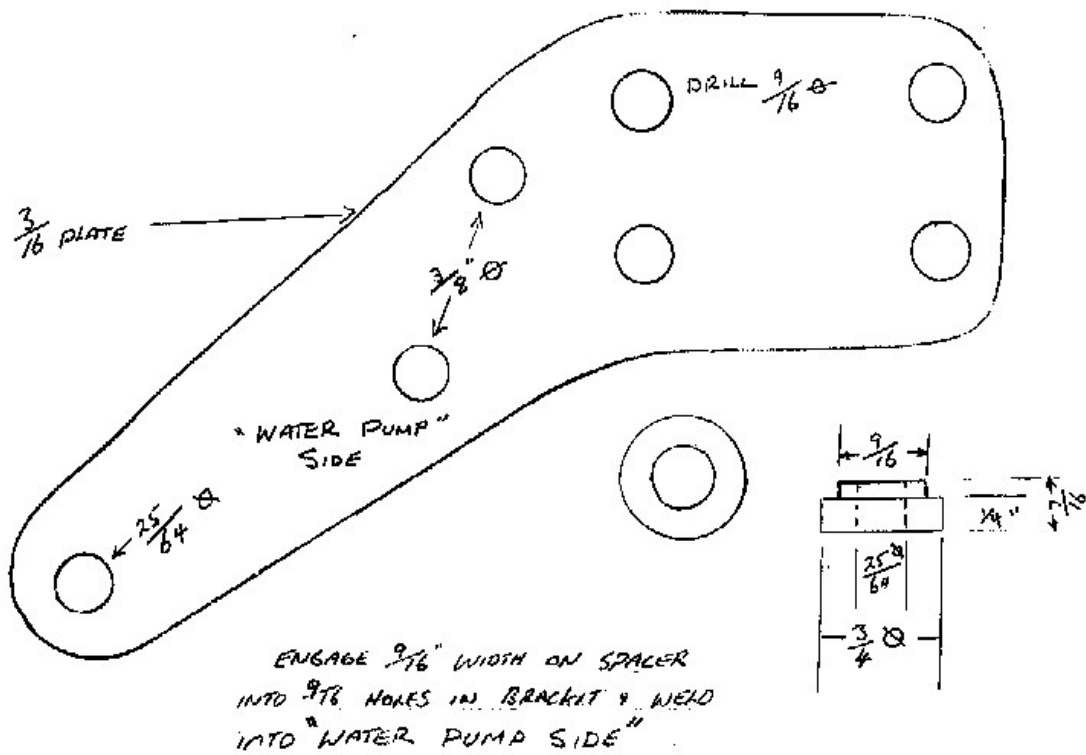


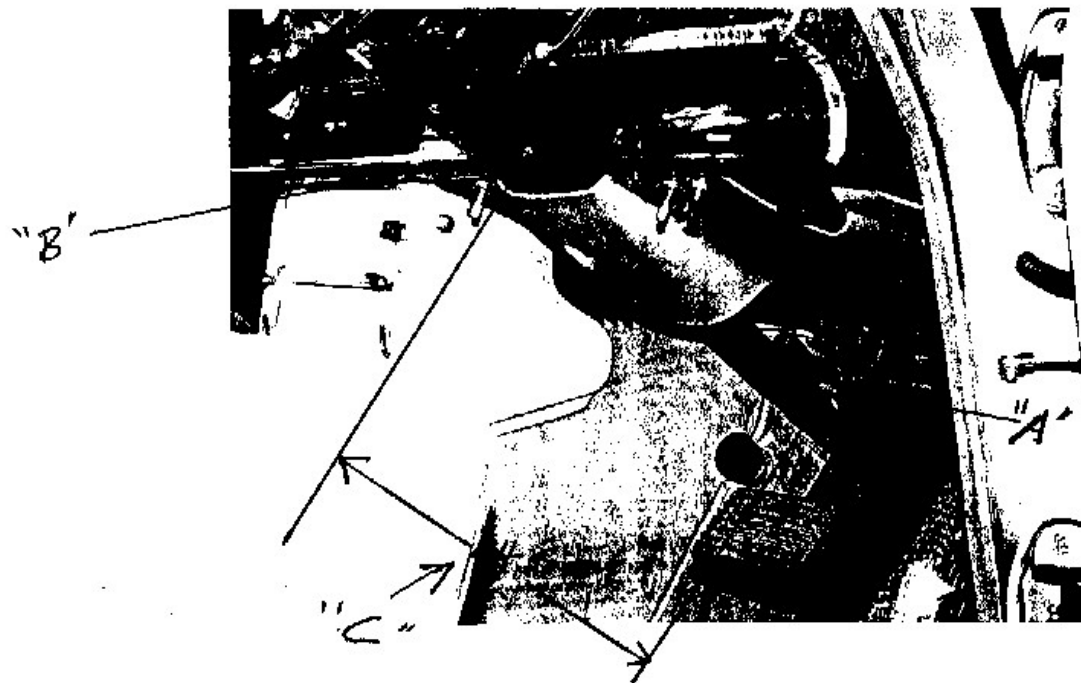
AIR CLEANER BASE:
(BREATHER CONNECTION).



ALT' SUPPORT BRACKET

FULL SIZE

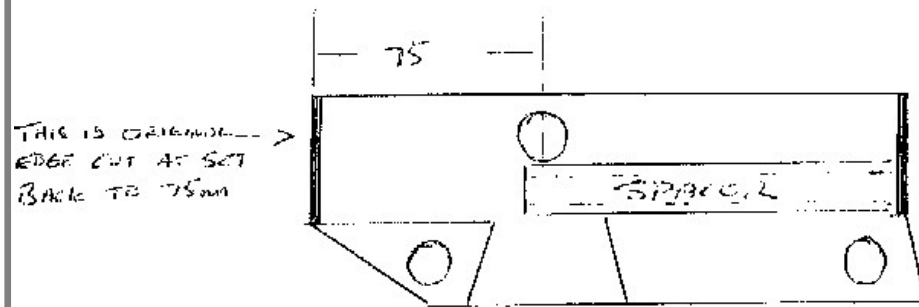




A SIMPLE CHECK TO SEE IF COLUMN IS FACTORY STANDARD.

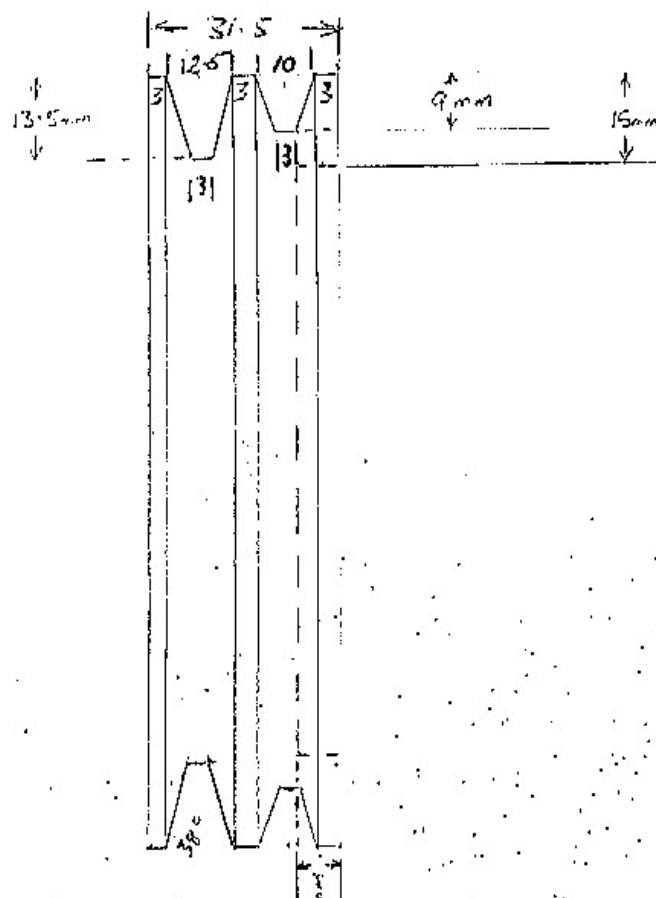
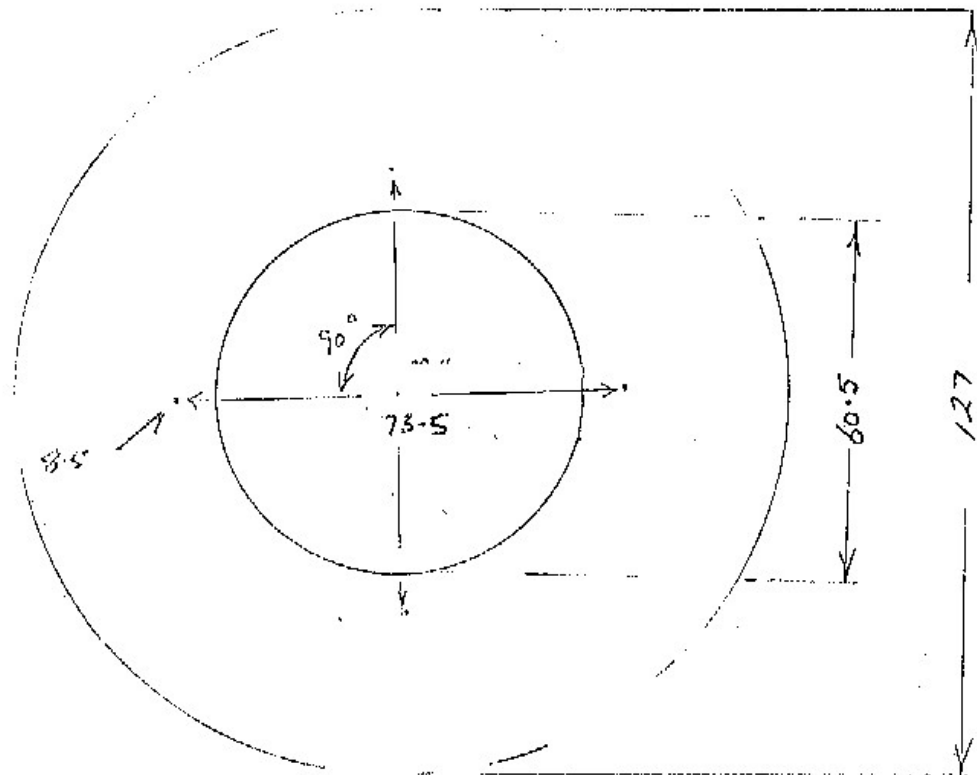
1. Remove HOSE ~~CLIP~~ "A" FROM LOWER OF COLUMN TO EXPOSE HORSESHOE & SLOT.
2. MEASURE FROM TOP EDGE OF HORSESHOE SLOT IN OUTER COLUMN TO CENTRE OF BINNICK SCREEN "B"
3. DISTANCE "C" SHOULD BE 44.5 CENTIMETRES

Compressor Mount

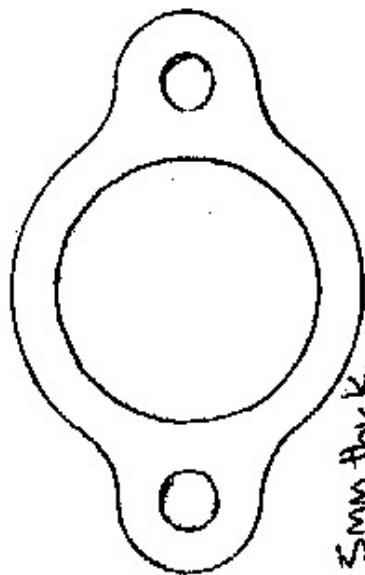
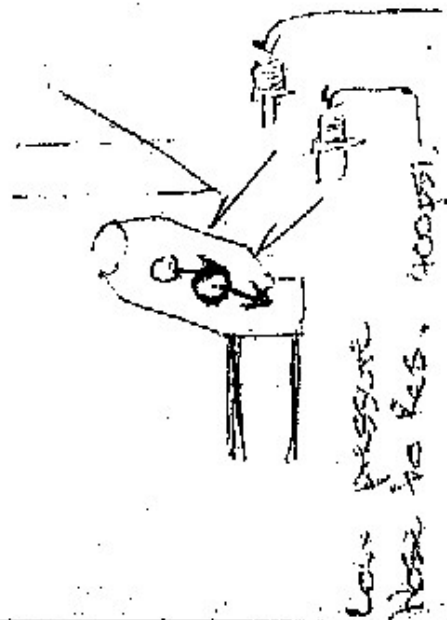


SPACER 19mm Round bar
 70mm Long
 10mm HOLE BORED THROUGH CENTRE

CRANK PULLEY (ALLOY)

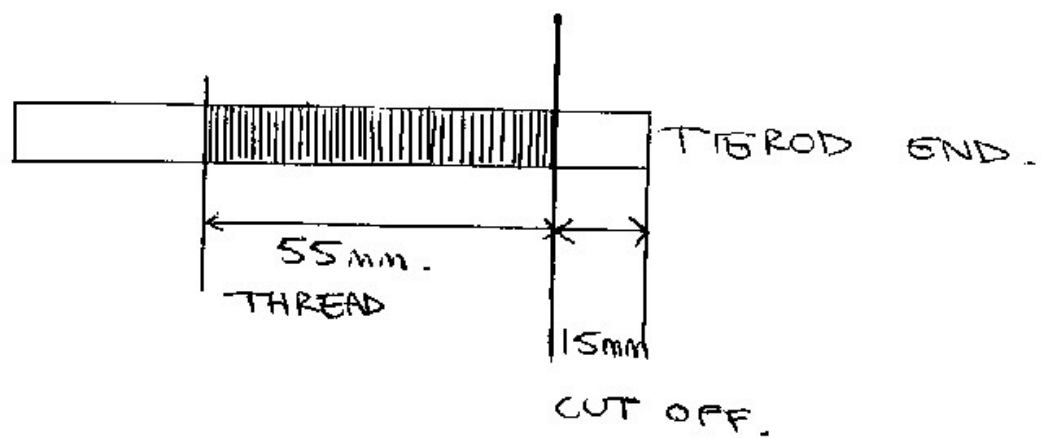


L-Hand Drive.
Power Steering.

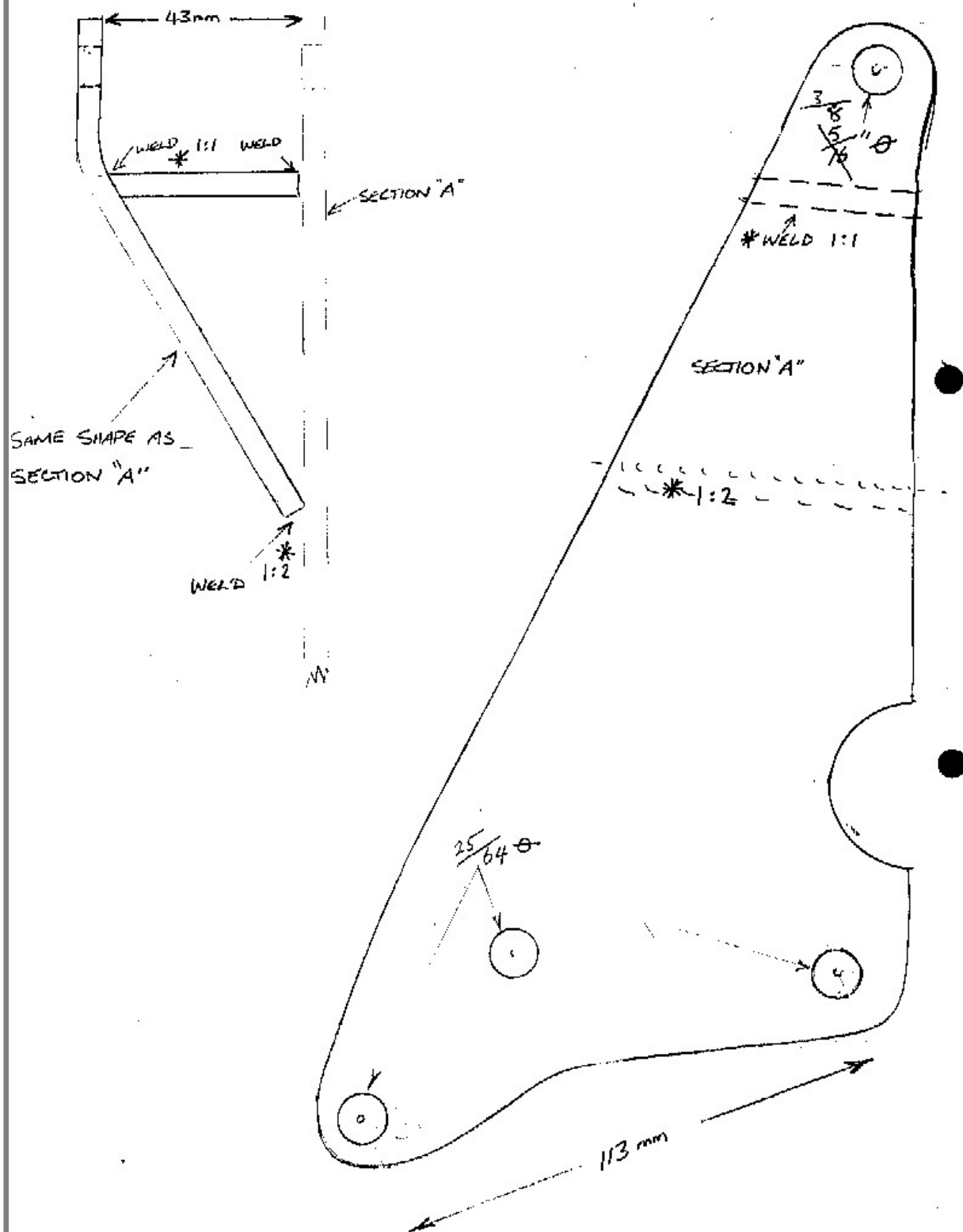


14.5mm thick.

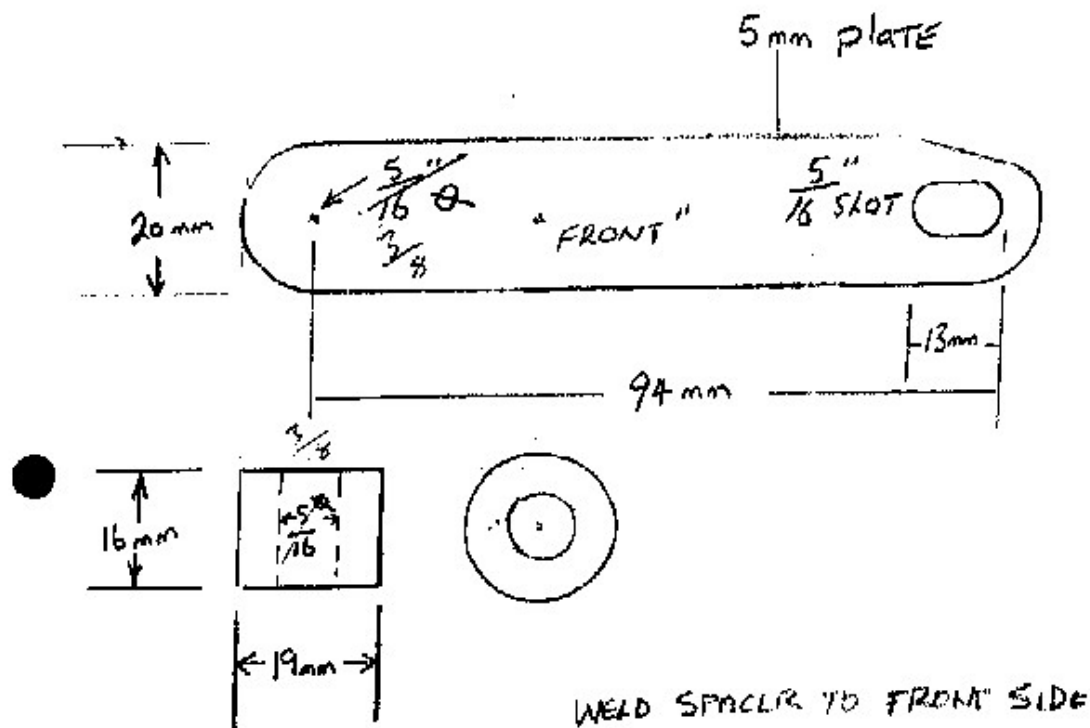
SHORTENING POWER STEERING ARMS.



POWER STEERING PUMP SUPPORT BRACKET
FULL SIZE
5 mm PLATE



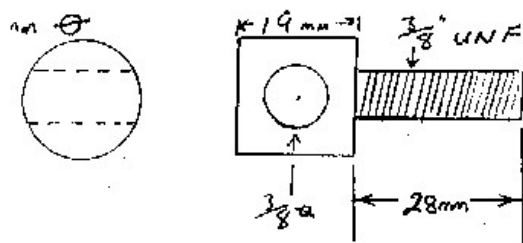
POWER STEERING PUMP STABILIZER



SPACER ONLY

COMP' ROD BASE

①



B5CBL

LT' ROD BASE

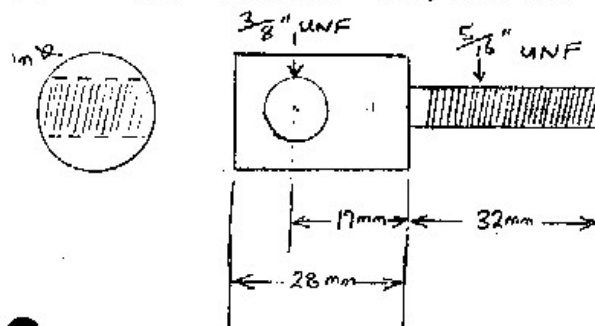
B5CBL

②

AS ABOVE

ALT' TOP MOUNT ADJUSTING BRACKET

③

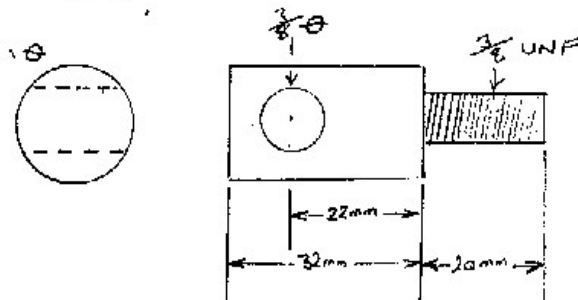


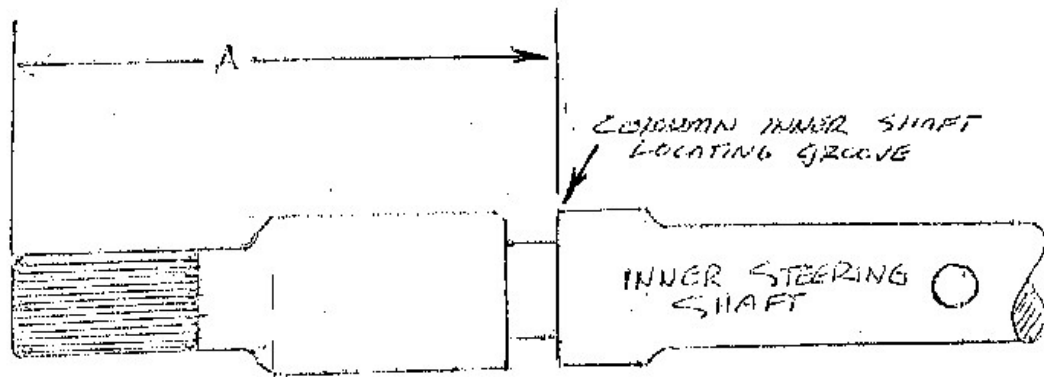
B5AATA

STEERING PUMP ROD BASE

B5PSB AUTC

④





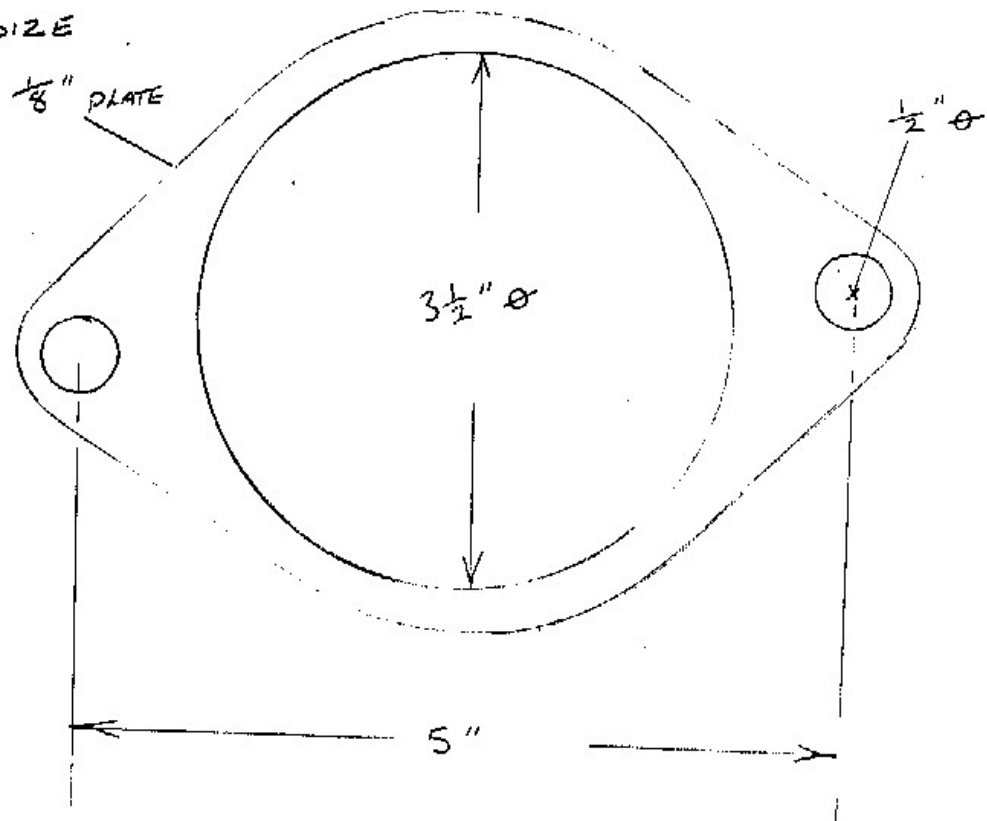
DISTANCE 'A' **74** mm minimum

1. REMOVE STEERING WHEEL
2. REMOVE - RUBBER EARTH CONTACT
3. REMOVE - PINION BOLT FROM LOWER COLUMN SUB ASSEMBLY I.E. TOP BOL FROM INTERMEDIATE SHAFT UNDER BUSHNET.
4. SLIDE OUT INNER STEERING SHAFT
5. MEASURE DISTANCE 'A'
 - IF WITHIN SPECIFICATION REPLACE I.E. NO ACTION REQUIRED.
 - IF DISTANCE 'A' IS **38** mm REPLACE SHAFT
 - IF ALL OTHER MEASUREMENTS ARE FACTORY I.E. OR 'A' = **123** mm THEN NO ACTION REQUIRED AS THIS IS A DIFFERENT TYPE OF SHAFT

Now OK A = 74mm

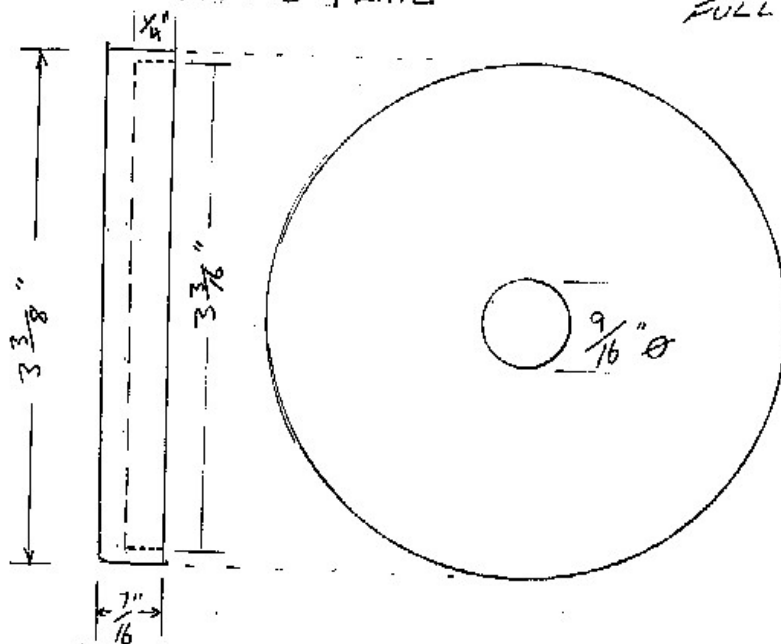
PRE ENGAGED STARTER SPACER

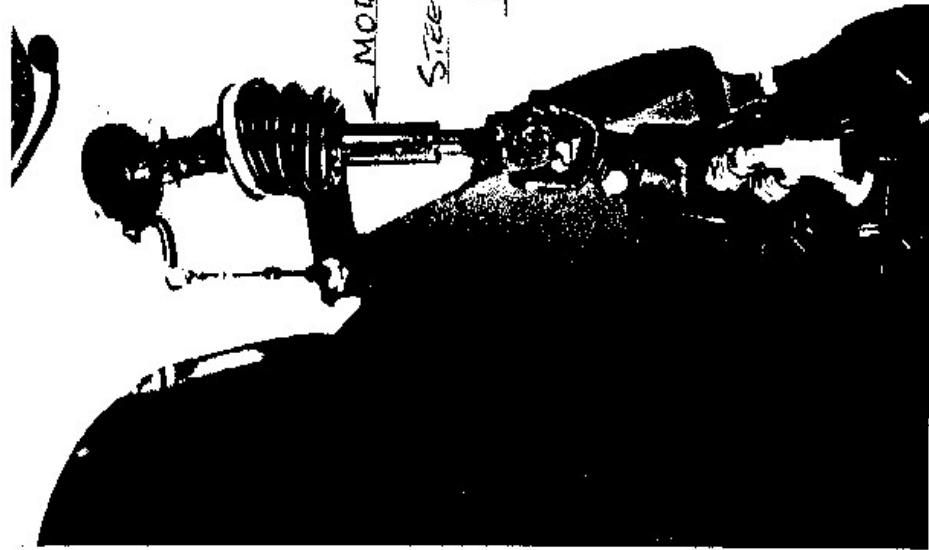
FULL SIZE



MOD 12 REAR SPRING PLATE

FULL SIZE



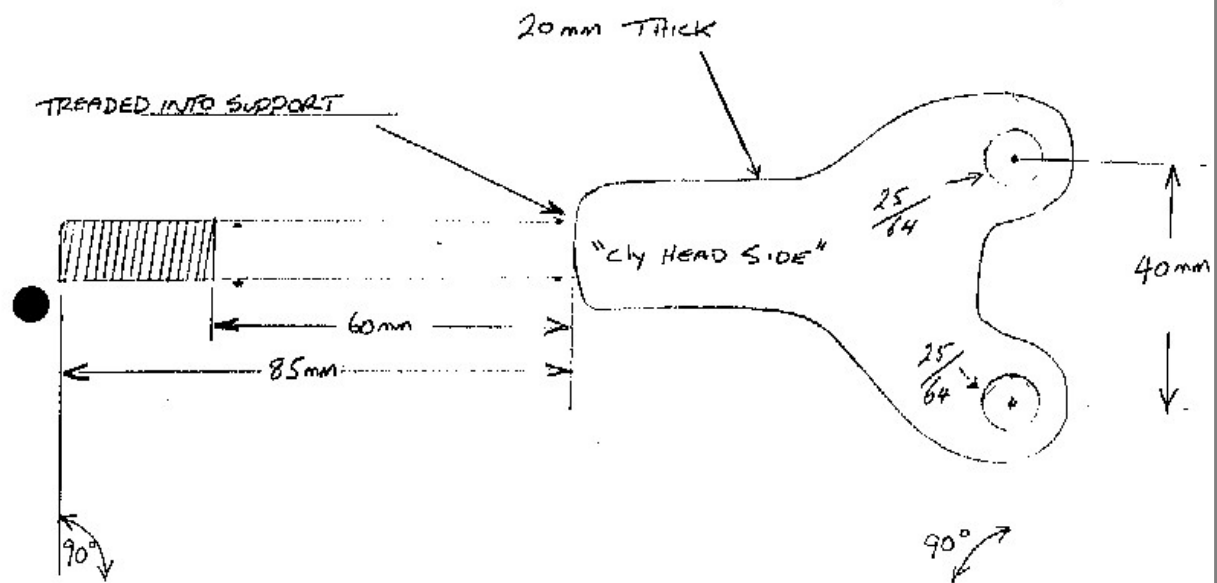


← MODIFIED INTERMEDIATE

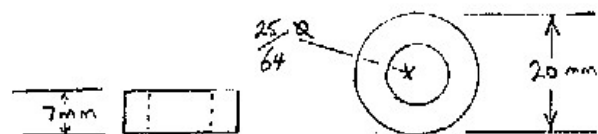
STEERING COUPLING

(SHORTEND)

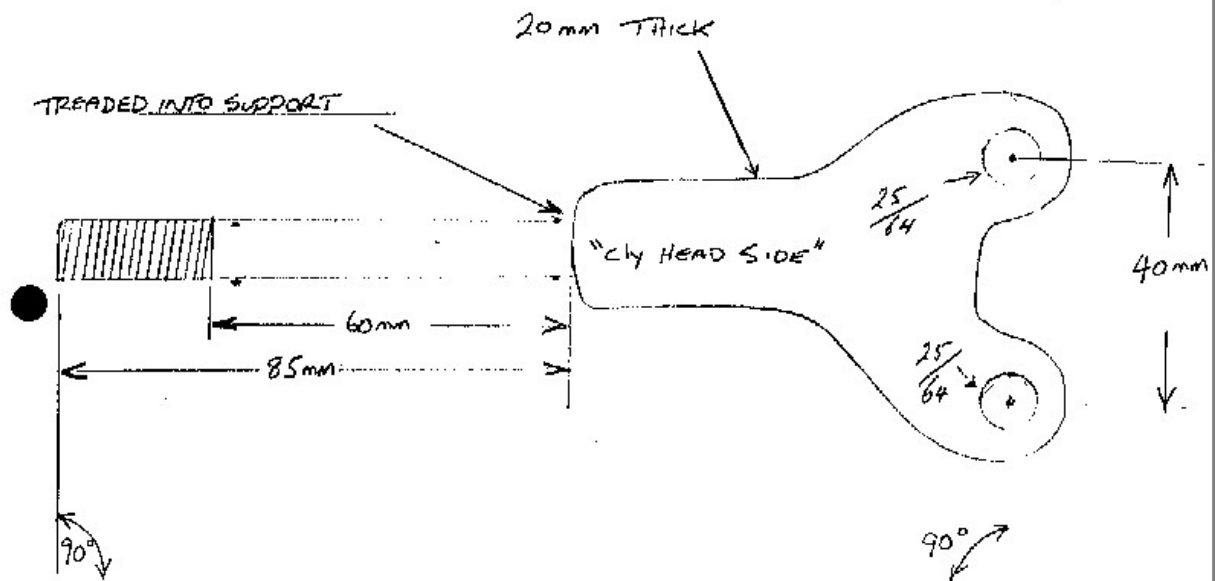
TOP ALT' SUPPORT



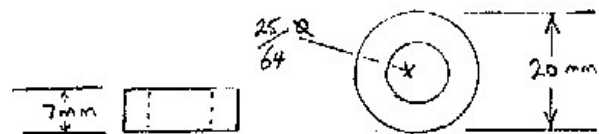
IN SPACER WITH HOLES IN BRACKET
AND WELD TO "CYL HEAD SIDE"



TOP ALT' SUPPORT



SPACER WITH HOLES IN BRACKET
AND WELD TO "CYL HEAD SIDE"



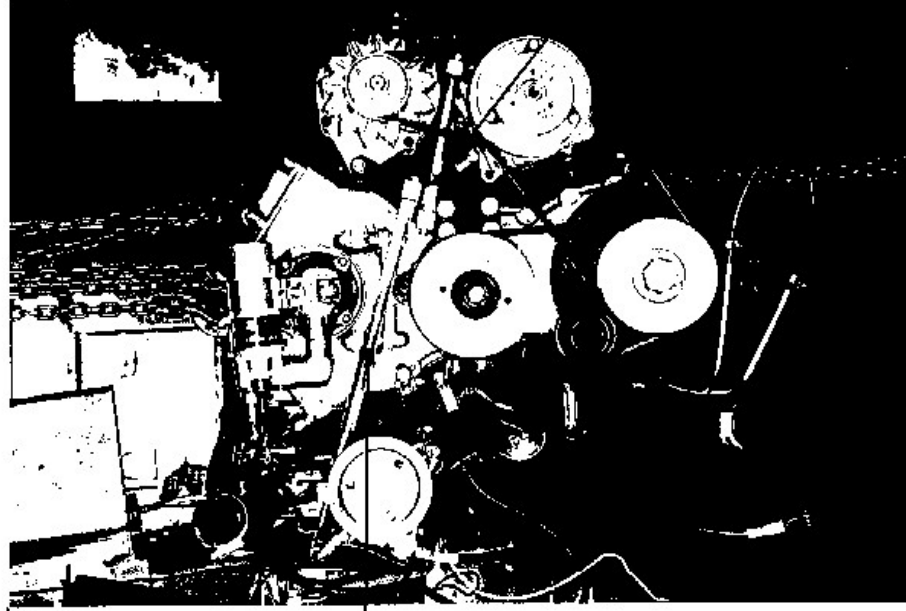
V BELTS ALL DAYCO TOP COG BRAND

ALTERNATOR 15250 11A0635

COMPRESSOR 17350 13A0890

WATER PUMP 15325 11A0825

POWER STEER 15325 11A0825

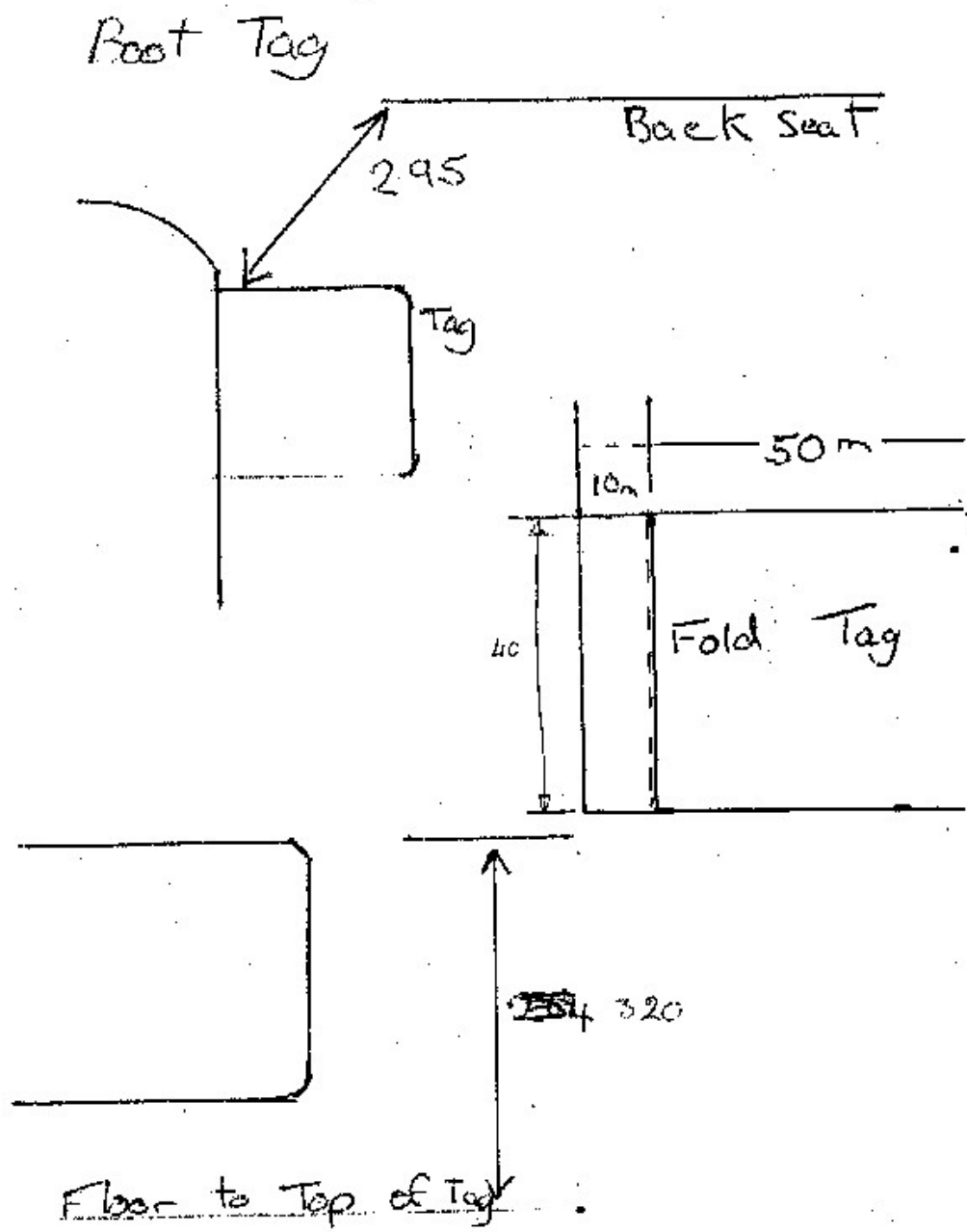


POWER STEERING PUMP
ADJUSTER

ALTERNATOR ADJUSTER

AIR CONDITIONING
COMPRESSOR ADJUSTER

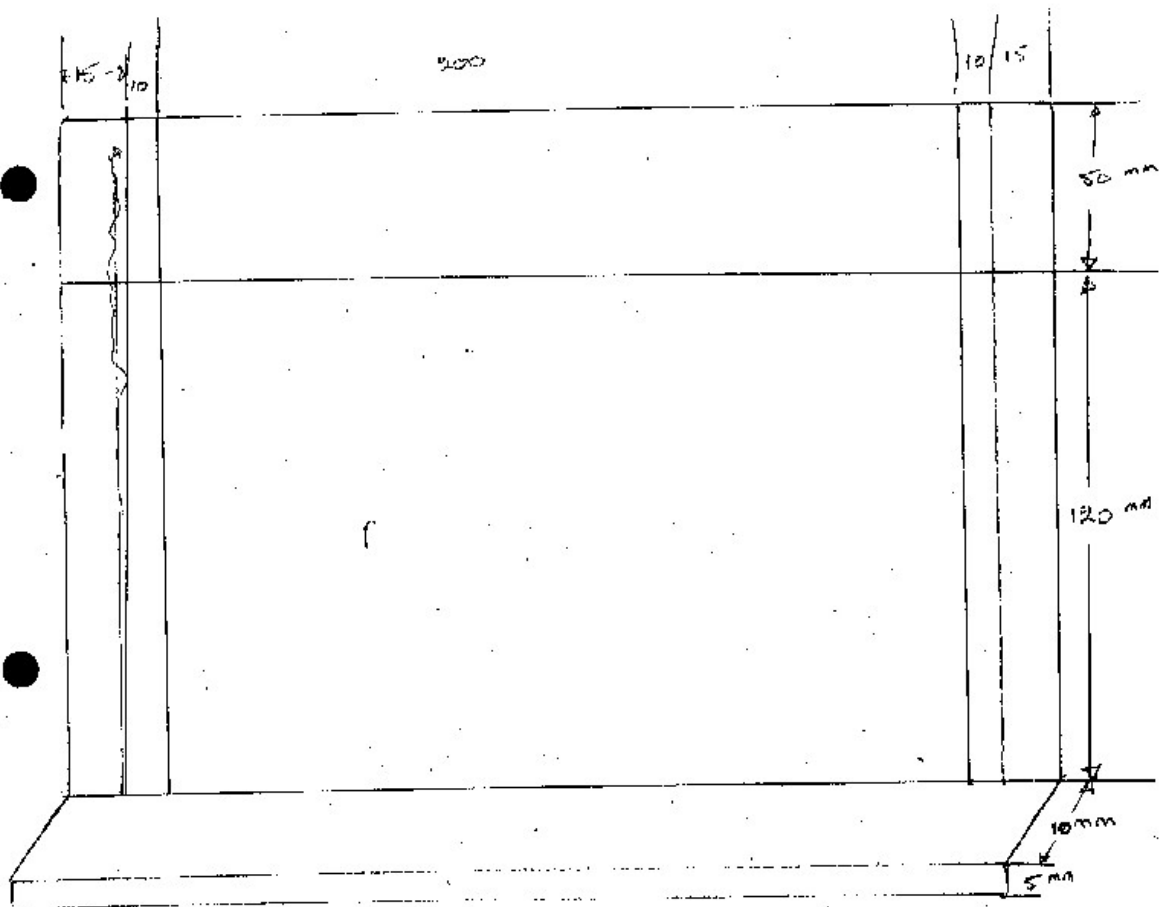
Trimming



Root Tag

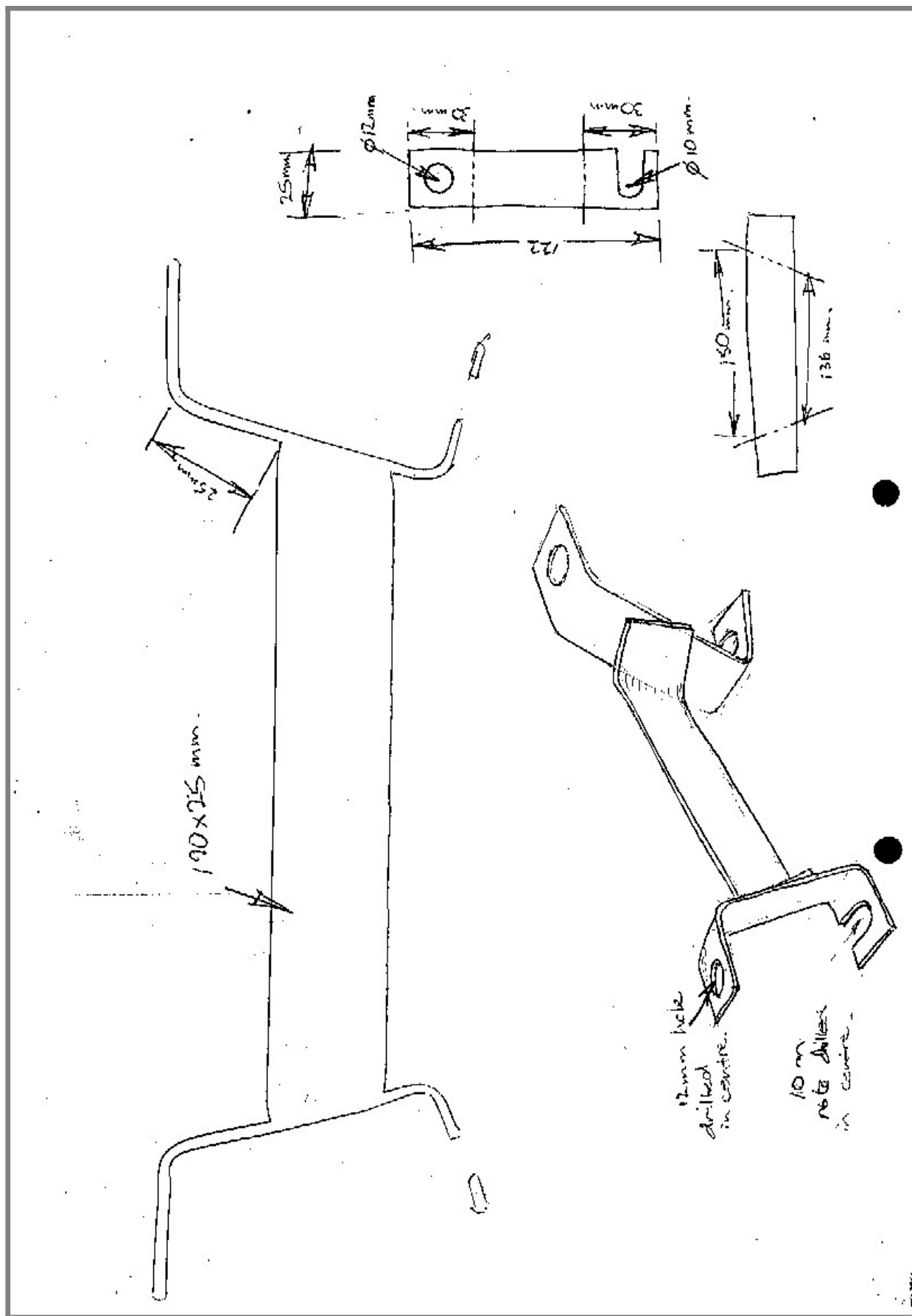
Back Seat

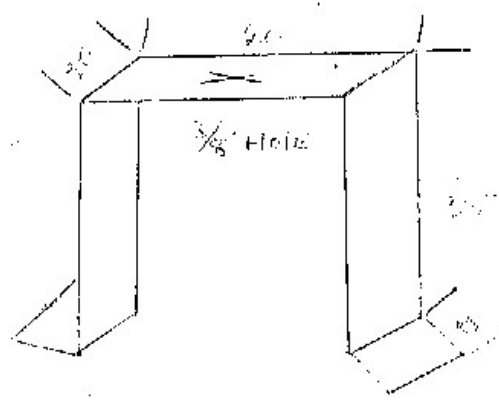
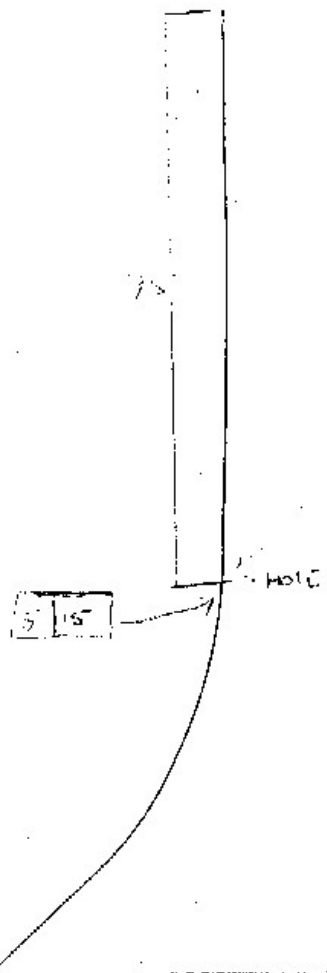
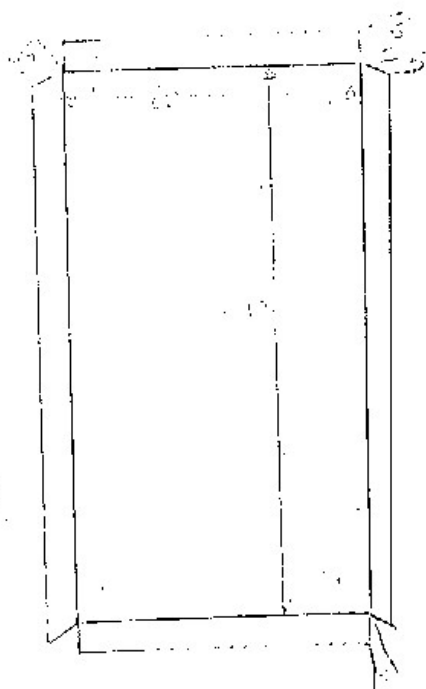
295



W 250

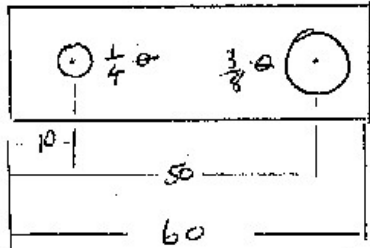
L 185 mm





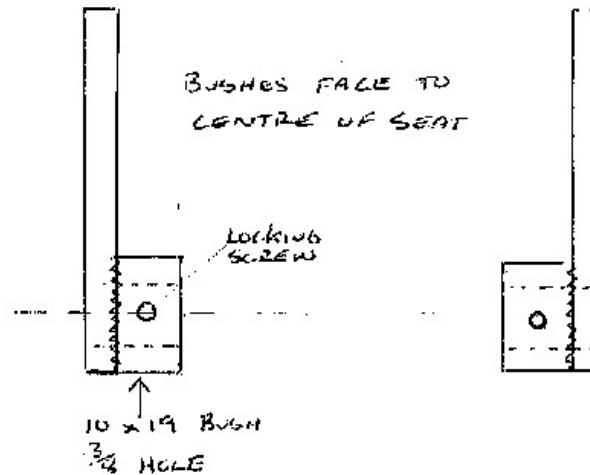
CROSS BAR LEVERS

5mm FLAT

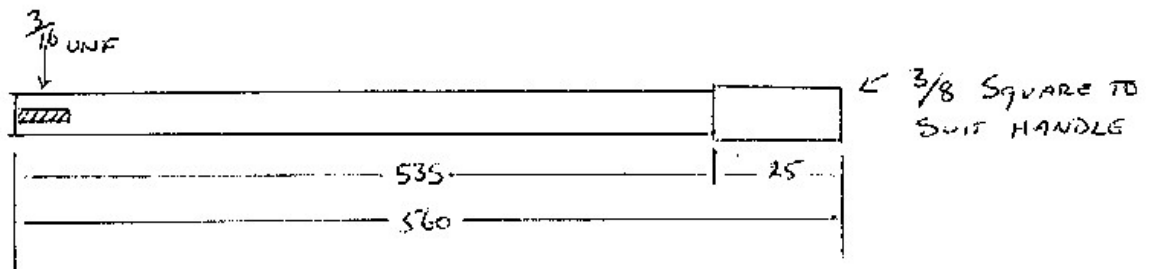


R/H INNER
L/H OUTER

R/H OUTER
L/H INNER

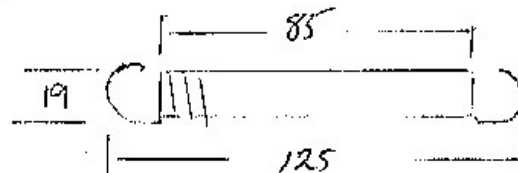


CROSS BAR: SAME L & R



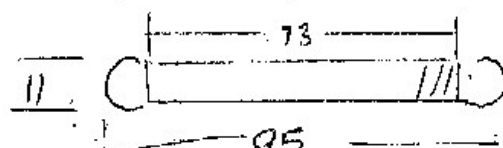
RETURN SPRINGS

INNER

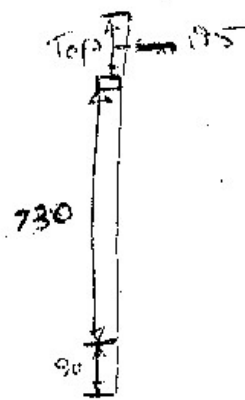
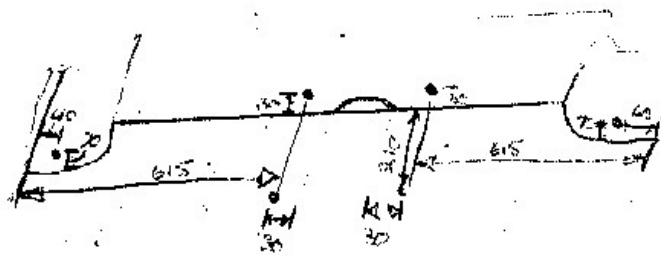


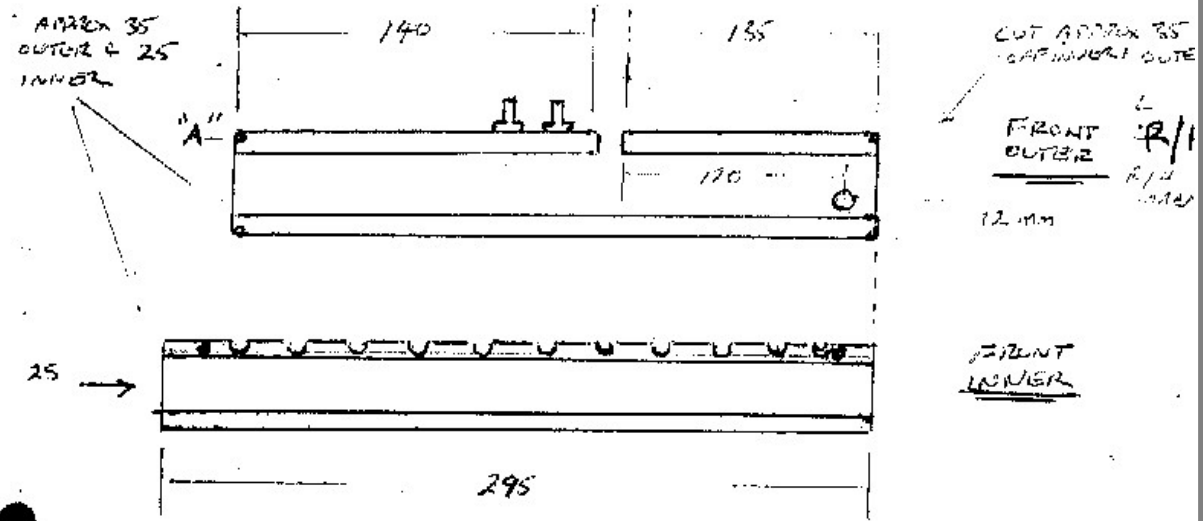
2.25 WIRE

ATCH

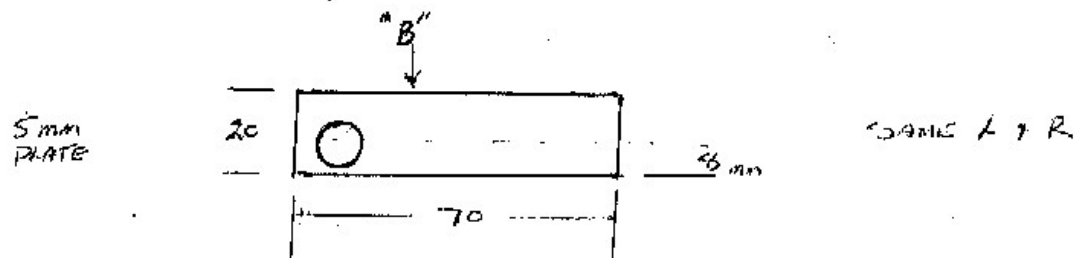


1.2 WIRE

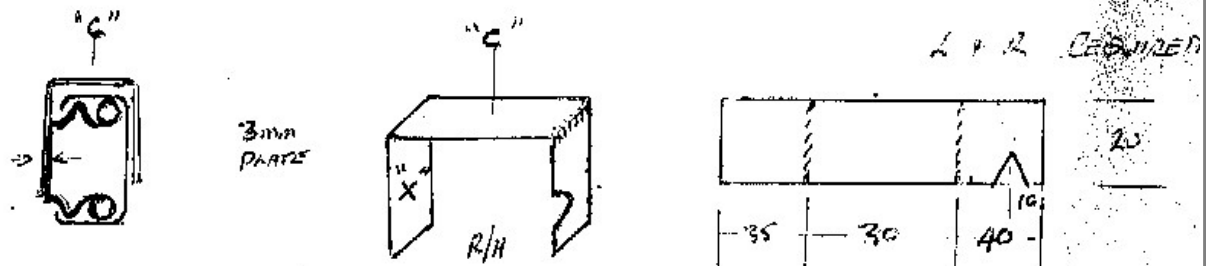




WELD DIMPLES TO PREVENT BALL BEARINGS COMING OUT



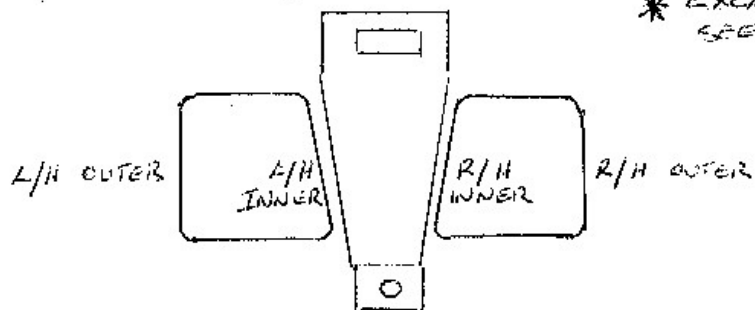
WEAR THIS BRACKET WHEN FRONT OUTER IS ATTACHED TO SEAT FRAME (SLIDES INTO REAR OFF INNER RAIL WITH OFFSET HOLE OPPOSITE RATCHET CUT OUTS) AND CATCH IS LOCKED IN 4TH NOTCH FROM FRONT



(FRONT) SPRING RETURN MOUNT: WELD TO FRONT OF INNER RAIL

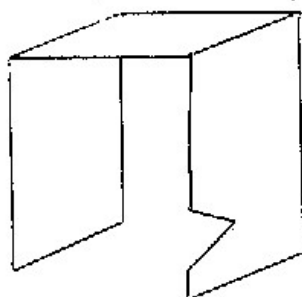
SEAT RECLINER LAYOUT
 L/H INNER IS THE SAME AS L/H OUTER
 L/H OUTER IS THE SAME AS L/H INNER

* EXCLUDES LATCHES
 SEE DRAWINGS



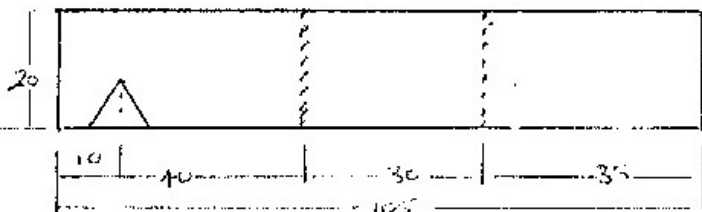
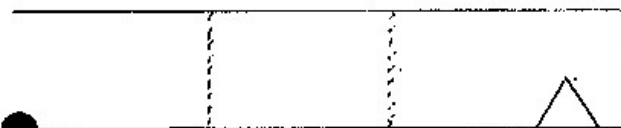
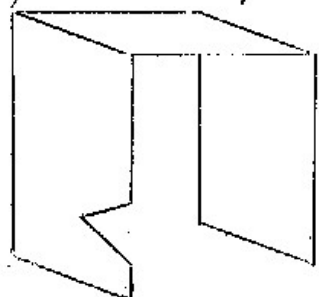
FRONT SPRING HOLDER

● R/H INNER L/H OUTER



20 x 3mm FLAT

R/H OUTER L/H INNER

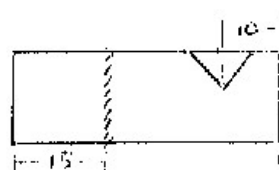


REAR SPRING HOLDER

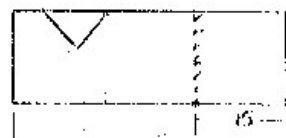
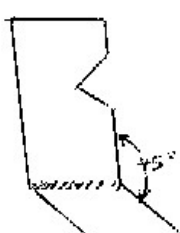
R/H INNER L/H OUTER



15 x 3mm FLAT

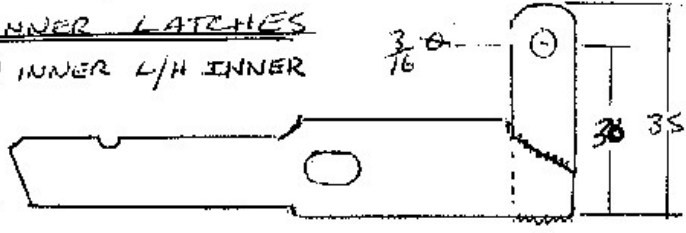


R/H OUTER L/H INNER



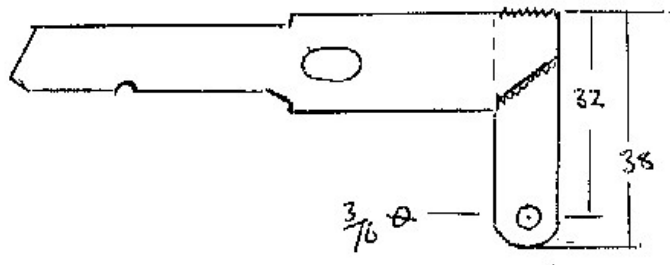
RUNNER LATCHES

R/H INNER L/H INNER



* L/H INNER
OPPOSITE LEVER
SAME DIMENSION

R/H OUTER L/H OUTER

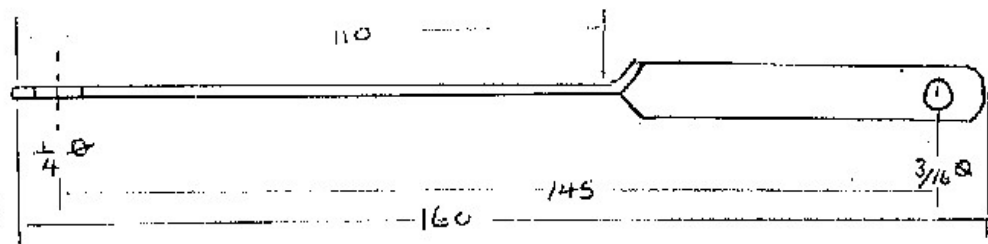


* L/H OUTER
OPPOSITE LEVER
SAME DIMENSION

LATCH INTERMEDIATE LINK

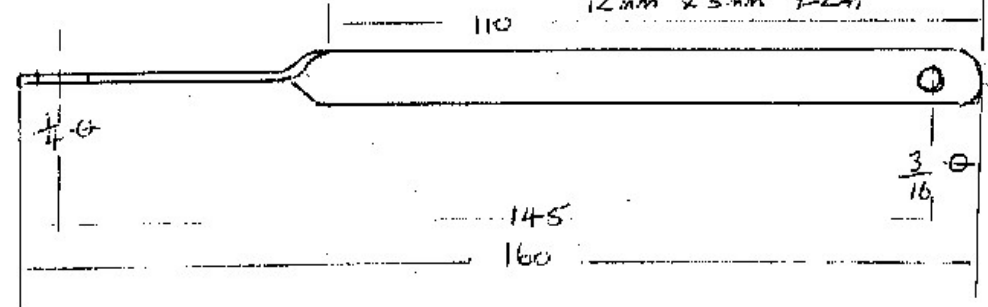
R/H INNER L/H INNER

12 mm x 3 mm FLAT

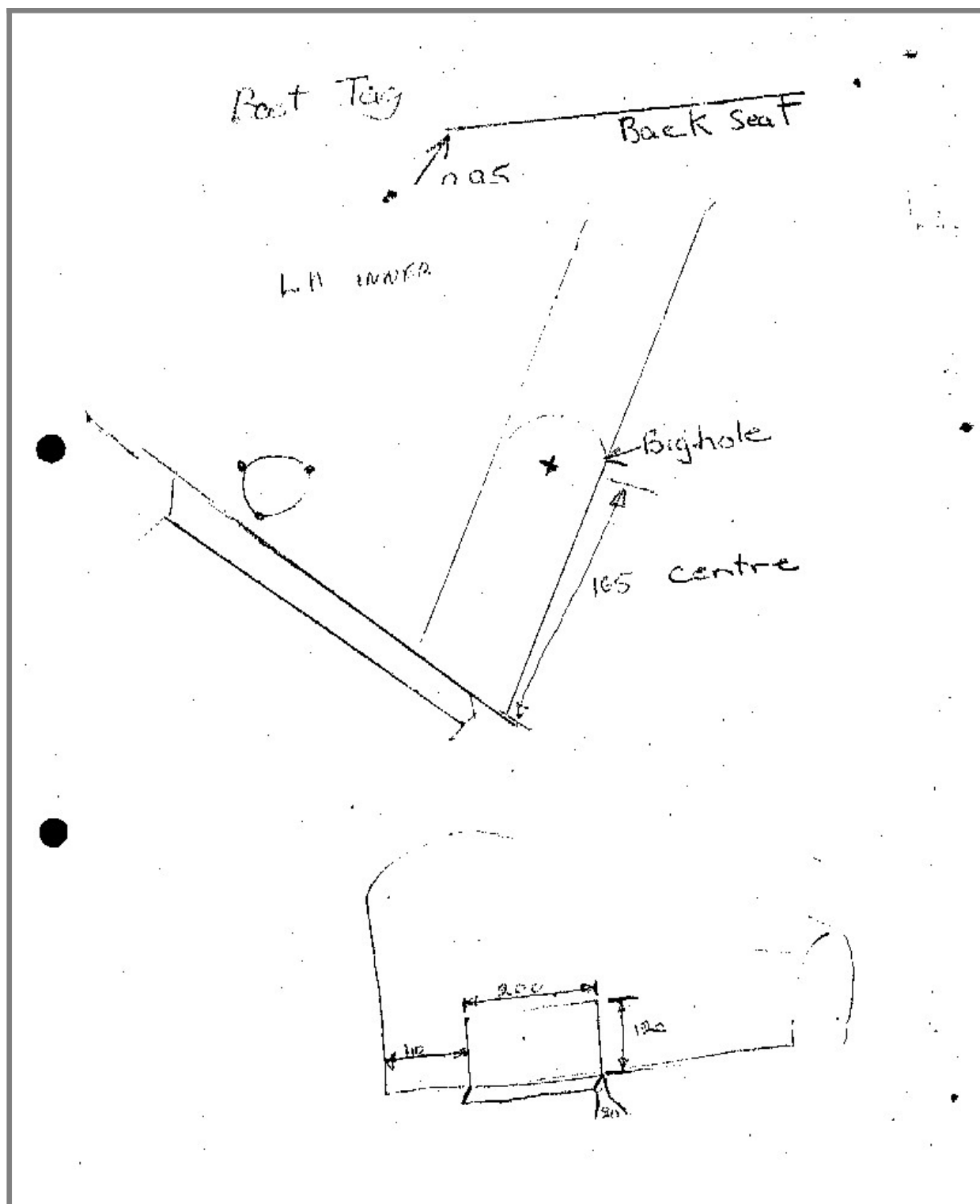


R/H OUTER L/H OUTER

12 mm x 3 mm FLAT

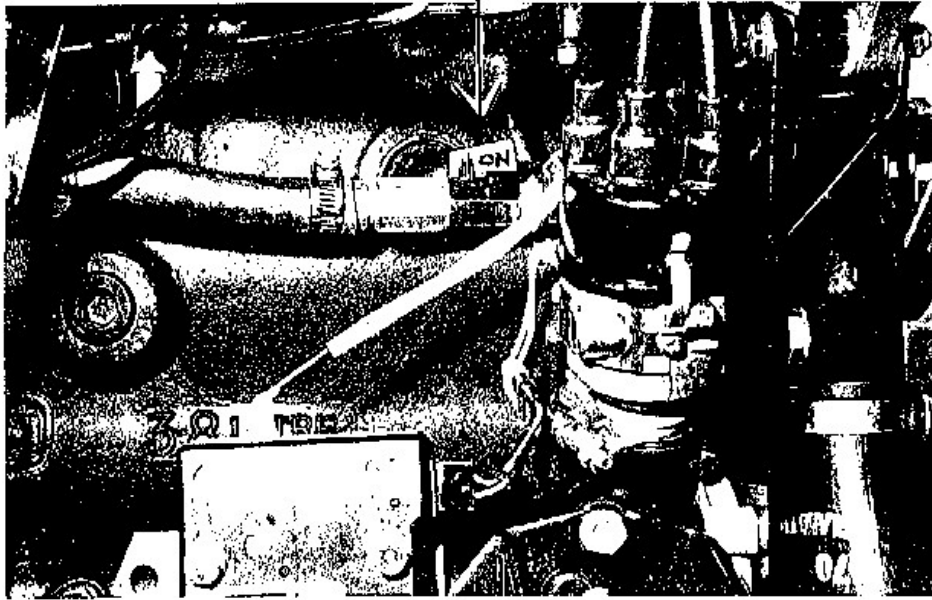


BOLT 1/4 UNF 1 1/2



Water

SECONDARY HEATER TAP TO TURN OFF IN
WARMER CONDITIONS TO HELP WITH HEAT BUILD
UP INSIDE CABIN

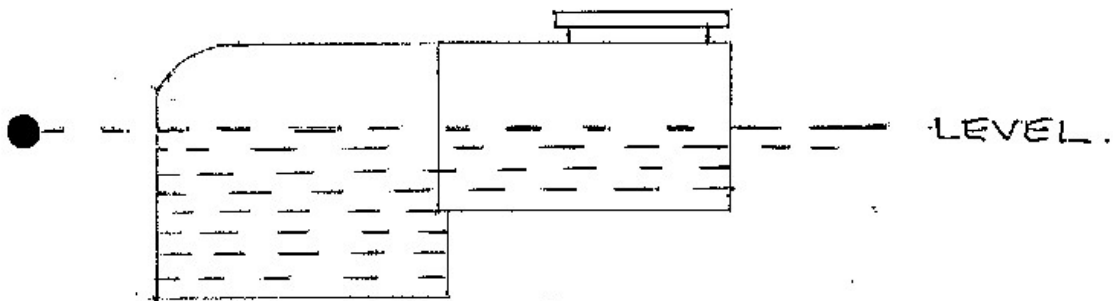


ON LATER VEHICLES THIS MAY BE MOUNTED
BELOW THE HEATER BOX

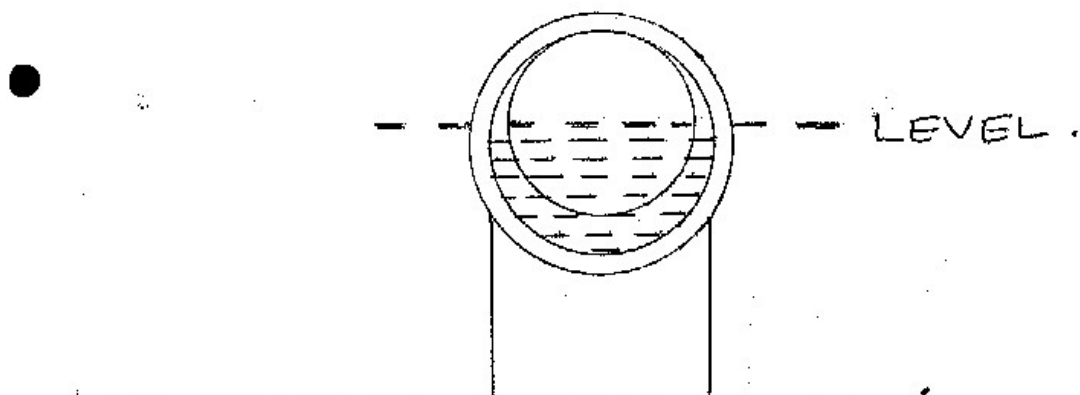
ENGINE COOLANT.

* SHOULD BE CHECKED WHEN ENGINE IS COOL, ON A LEVEL SURFACE.

FILL TO LEVEL MARK.



SIDE VIEW.



FRONT VIEW.

ENGINE COOLANT

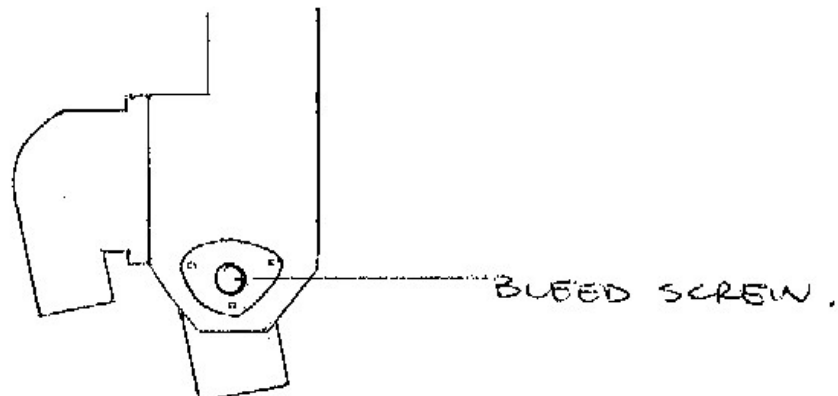
FILLING SYSTEM FROM EMPTY OR WHEN DRAINED.

THE COOLING SYSTEM MUST BE
BLED OF ALL AIR.

TURN HEATER TO HOT.

TURN EXTRA HEATER TAP UNDER INLET
MANIFOLD TO ON.

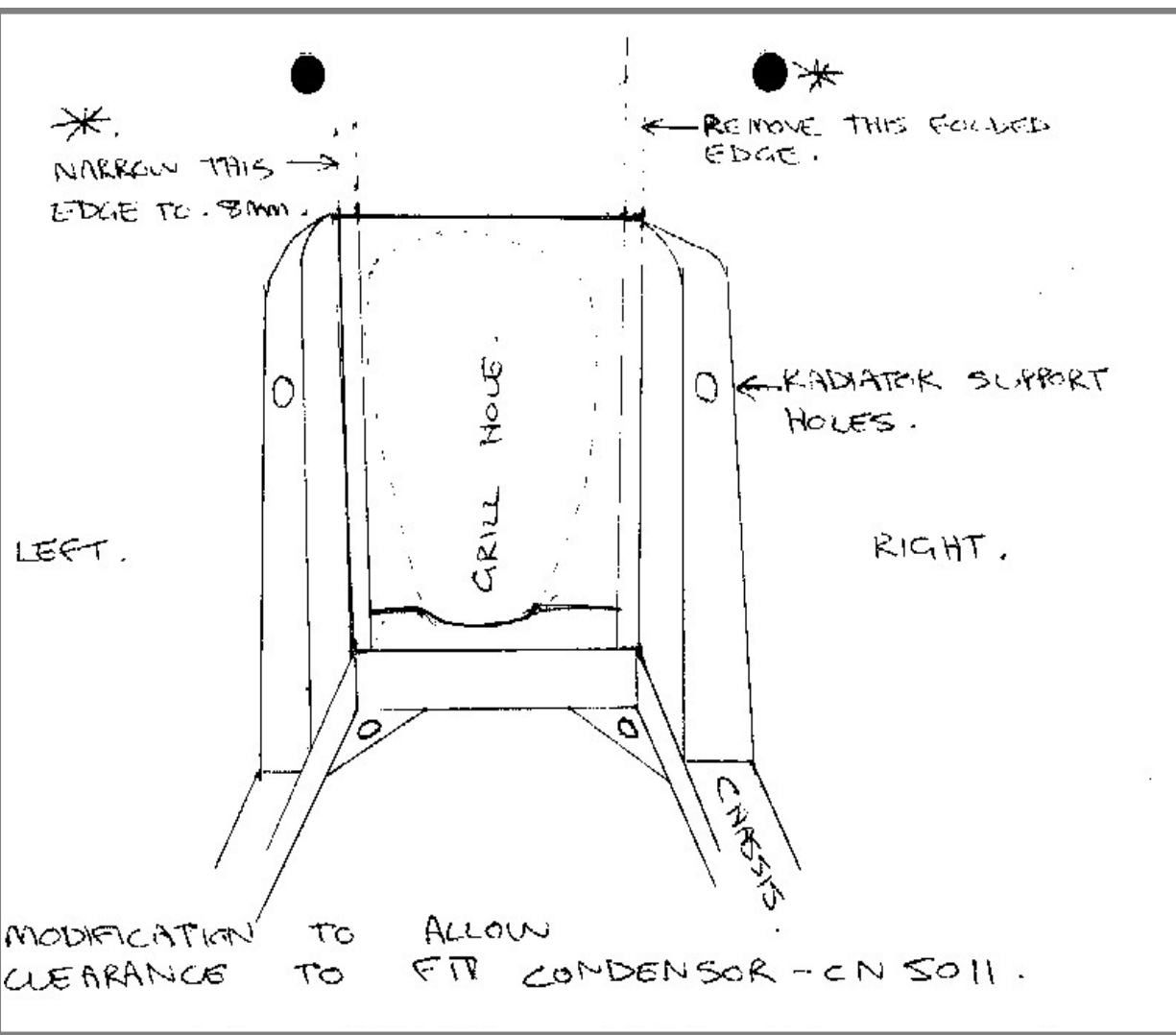
- REMOVE BLEED SCREW FROM WATER
MANIFOLD BESIDE THERMOSTAT.

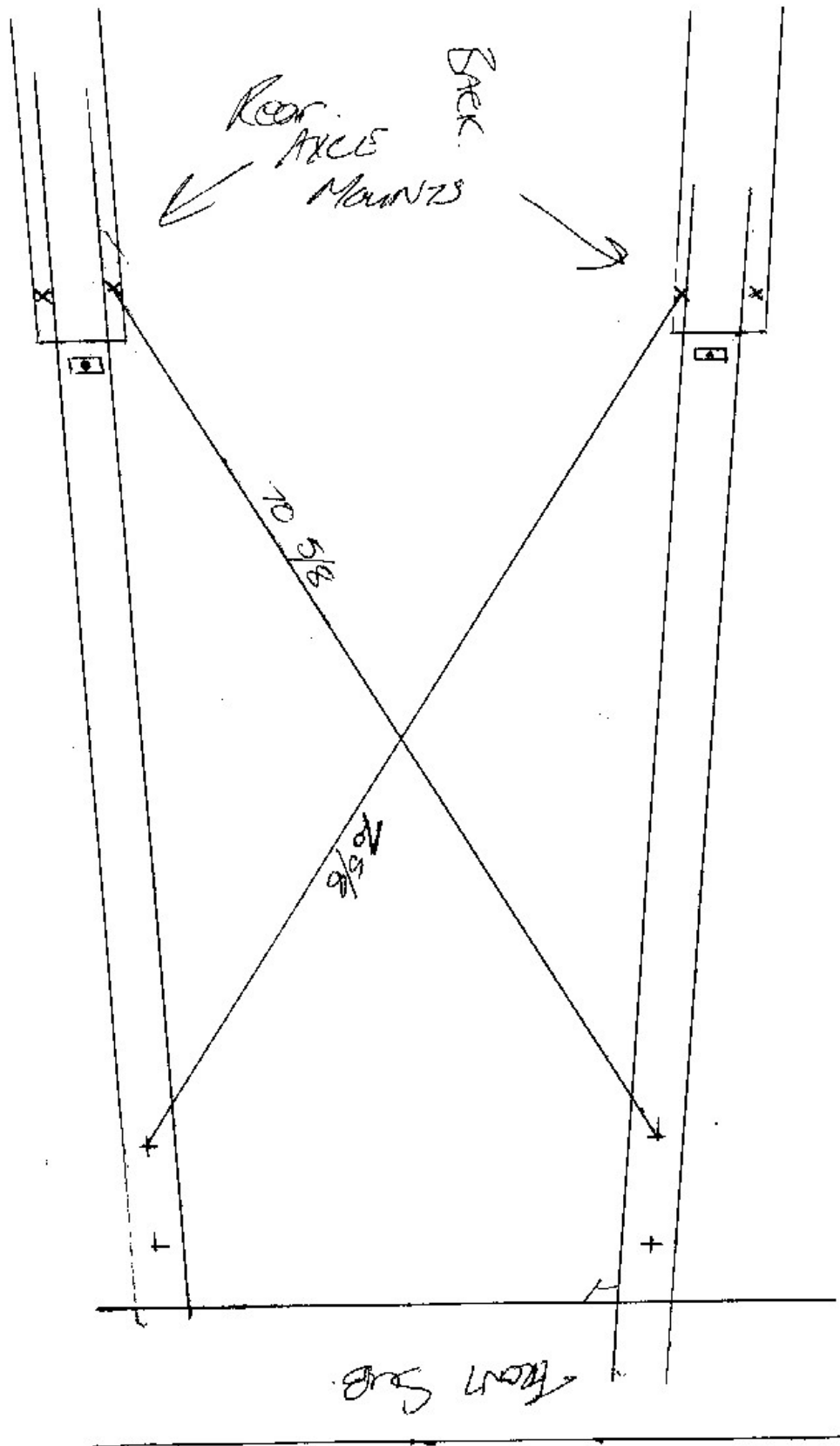


- FILL UNTIL WATER ONLY FLOWS FROM
BLEED SCREW - REFIT SCREW.

USING ANTIFREEZE WITH GLYCOL TYPE
INHIBITORS IS REQUIRED.

APPROX 4 Litres to the complete system
when filling.



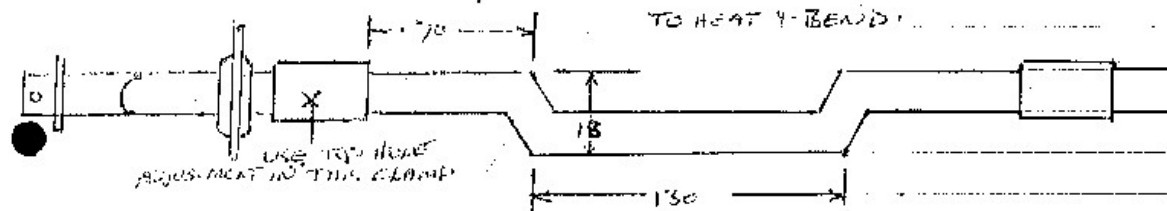


4.2 Litre Engine

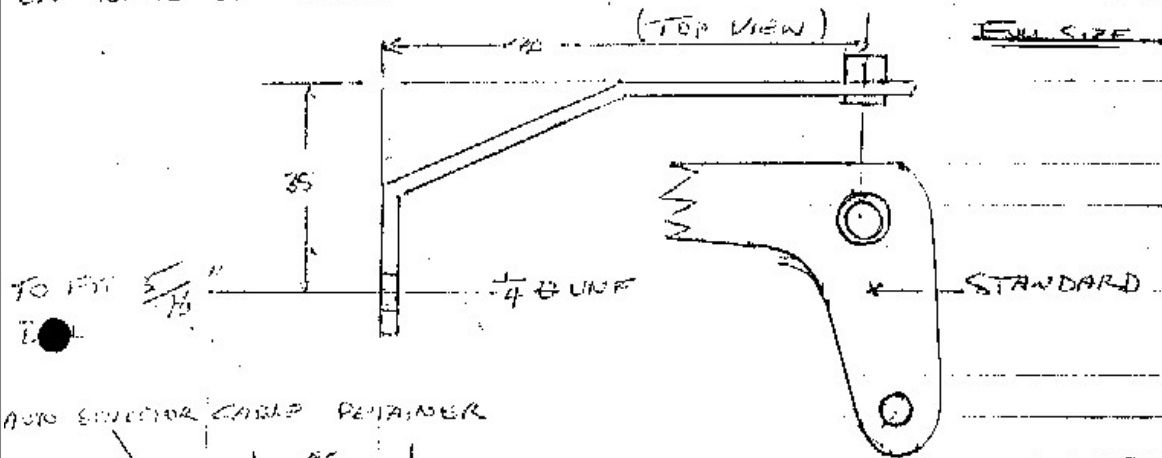
4.2 Litre Conversion Triple Carb
 Modify Body - Panel Shop

Modify Mk II Water Pump - 4.2 Impeller etc
 Use Downward Facing Oil Filter Assembly (Std Mk II)
 Power Steer - Use Dofic Top CG 15330 - 11A0840
 Add 20mm Spacer to Adjusting Rod

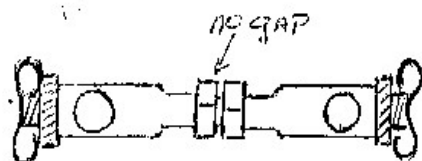
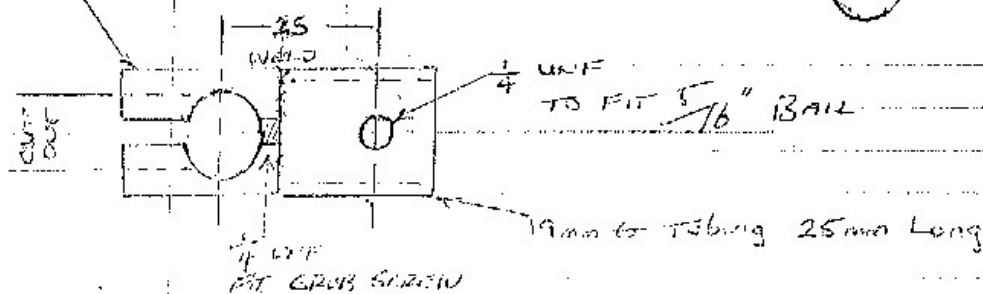
Accelerator Linkage L/H (Top View)



BEND TO CLEAR PLATE
 ON BACK OF BLOCK



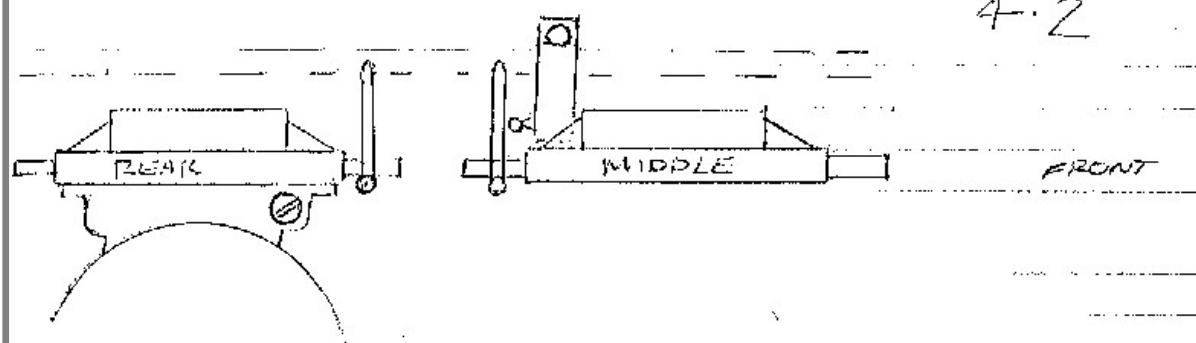
AUTO SELECTOR CABLE RETAINER



C16809 x 2

424313/2 x 2 - RAIL 5/16"

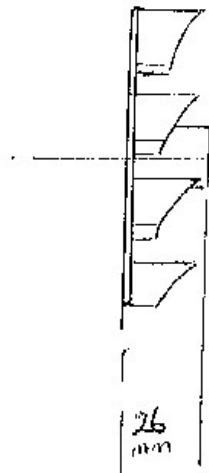
SAME AS AUTO SELECT CABLE



DELETE 3-4 - 3-4 BOOT BADGE HOLES
 CENTER VAND BADGE USE NTS
 MAKE UP THROTTLE PEDAL STOP
 PERFORM P/B 1 WASHOR RESERVOR

MK II WATER Pump FOR 4.2

A-2 IMPELLOR

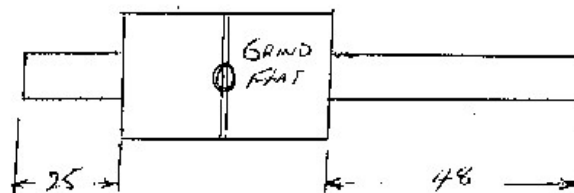
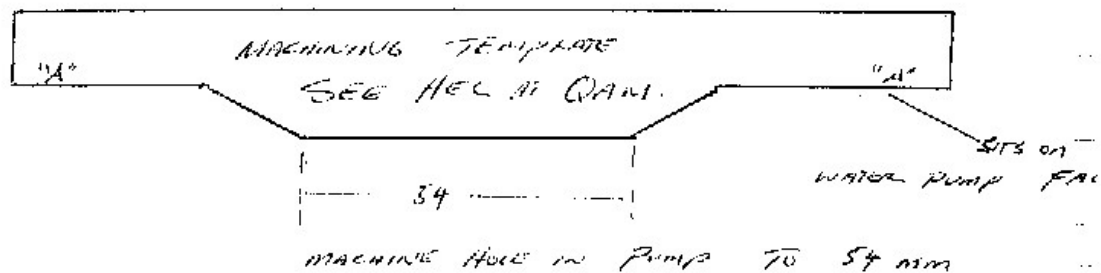


ADDITIONAL SPACER

IF IMPELLOR IS NOT 26 mm
MAKE SPACER FROM SAME
MATERIAL TO REQUIRED THICKNESS

BEARING SACCO BEARINGS FPS061 RHP J2 15'

SEAL JOHN HILL TC06211868 1604 1.3-16"
ALL RUBBER PBR CHART-Bearing 5/8"



IMPELLOR HEIGHT TO Body 14 mm

APPROX 0.25" IMPELLOR TO BODY CLEARANCE

It can't be done, Mate!

Drew Rafferty

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